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CONTENTS

Advice to the Minister of Transport

IN our last week's issue we suggested that, instead of waiting for an opportunity to present a new Transport Bill to deal with the re-organisation of internal transport which the Government is known to have in mind, the same end could be secured more quickly by amendment of the schemes of delegation by the British Transport Commission under which the various Executives operate. There is good reason to believe that such proposals will be embodied in the Minister of Transport's promised statement after Easter. It would certainly save not only a great deal of time but also limit the political controversy which any change in the transport organisation is likely to occasion. Free discussion of transport matters should not be arbitrarily curtailed, but experience over the past few years suggests that when it is given full rein it ranges over so wide a field that basic principles are often submerged in a plethora of rhetoric. The Minister would be ill-advised to make any drastic changes in the territorial boundaries of the present Regions. It would be far simpler, apart from relatively minor amendments, to deal with the railways as they are now grouped—although there may be good arguments for running together the Eastern and North-Eastern Regions—and to concentrate on improving organisation and administration. It might well be that a solution to some of the problems in this connection might be found by the reversion to a system of administration and management more analogous to that of the old railway companies. There is no good reason why we should not have in effect nationalised railway companies with boards of directors and general managers responsible to them. It would, however, be unsound to make the top layer of administration too dependent on the whim of the Minister, for this might lead to political interference or at least to a tendency to change administrative personnel to accord with whatever government achieved power. Obviously, the primary aim of any alteration of the present organisation must be the attainment of greater economy and efficiency in operation. It is on this basis only that public disquiet as to the future of the transport system of this country will be allayed.

Anglo-Scottish Motorcoach Services

COMMENT on the decision of the Minister of Transport, Mr. J. S. Maclay, to revoke the licence granted under the Road Transport Act, 1930, to Northern Roadways Limited to operate motorcoaches between Scotland and London and elsewhere in England has emphasised that the objectors to the new service were the nationalised railways and State-owned road transport undertakings. The Minister, it is said, in accepting the recommendation of the Inspector who heard the appeal against granting the licence, sought to protect State-owned transport against private enterprise. In fact, the objectors included, besides British Railways and the State-owned Scottish Omnibuses Limited, certain privately-owned road passenger undertakings. There is nothing new in such objections, and had the railways not been nationalised, the railway companies concerned doubtless would have lodged objections, as they did in similar cases before the war. The Inspector who heard the appeal was bound under the Act to consider the effect on the public interest of any redundancy of transport facilities, which includes duplication of existing travel facilities provided by the railways as such, and not as State-owned transport. The motorcoach service in question competes directly with the railways. Meanwhile, revocation of the licence to Northern Roadways Limited has been suspended because of the many bookings which were made by the company pending the hearing of the appeal against the granting of the licence.

Cheap Air Travel in the U.S.A.

THE domestic airlines in the United States are waging a price-cutting war. To meet the keen competition of many small operators who have arisen since the war, the large companies are cutting out luxuries on many flights and offering "sky-coach" service. The term "coach" is used in its American railway sense of signifying ordinary seat travel, distinct from Pullman, sleeping car or other supplementary fare travel. The trend towards lower air fares has the approval of the Government, which recently sanctioned drastic reductions, bringing down the lower fares to about 3d. a mile. Another inducement offered by the larger airlines is family fares on three days a week; one member of the family is carried at full rate, and the others at half rate. The public is responding; in a recent month American Airlines, the largest passenger airline, carried more than 56 per cent. of its passengers at "coach" or other low fares. The small companies have declared that they are ready to reduce their fares still more, if the large operators continue their challenge.

Courses for Cartage and Terminal Supervisors

FREIGHT terminal and cartage work today is complicated by the necessity to keep down mounting terminal costs, by the high cost of labour, by the sometimes awkward layout of depots overdue for rebuilding or

extension, and by the necessity for the supervisor to get the best out of his men without the disciplinary sanctions available a generation ago. Against this, many mechanical devices for freight handling are available and in course of development, and palletisation, if it eventually is widely adopted, may well revolutionise merchandise traffic. All these and many other problems are being discussed, officially and unofficially, during and after the formal discussions at the five courses for cartage and terminal supervisors held, this year, at the British Railways Staff Training College at Woking. Some account of the first of these is given elsewhere in this issue. Besides the valuable exchange of views under the chairmanship of an experienced goods traffic officer, and the pooling of their own experiences, students can see modern equipment in use in a goods depot, and a demonstration of palletised methods, including the possibilities of the 40-in. × 40-in. pallet, the most suitable for loading in British Railways wagons.

Reclaiming Tungsten Steel Scrap

IT has been the practice for many years in the engineering industry to economise in the consumption of the more expensive alloy steels by tipping mild steel shanks for cuttings tools, and welding carbon steel ends to taps and reamers. With a view to identifying the more costly steel for reclamation after the tools have reached condemning size, the Research Department of the Metropolitan-Vickers Electrical Co. Ltd., has evolved a method which accelerates the results obtained by exposure of the steels to atmosphere, and is less expensive than other effective methods, such as determination of magnetic or chemical properties. The new process consists of cleaning a small area of the tool and treating this with a strong solution of ammonium chloride (sal-ammoniac) in water, and exposing it to the air while wet. In a short time the carbon steel shows signs of rust, which is more apparent than that on the alloy steel portion. The process provides an inexpensive method on recovery of alloy steel, which by reason of its shortage has become extremely valuable.

The Mexican Railway

THE remodelling, as part of a national programme of railway improvement, announced in our January 4 issue, of the section extending 150 miles out of Mexico City on the former Mexican Railway to Vera Cruz, recalls that this line was not only the first railway in Mexico, but has always been one of the most difficult to work in North America, because of bad survey work without sufficient exploration of alternative routes. Another distinction was that at one time it had to "assume" a branch that was probably the longest horse-worked railway anywhere—70 miles, and with 1 in 10 gradients. Unfortunately, early last century, the old *camino real*, or King's Highway, between Mexico and Vera Cruz *via* Jalapa, which was paved and guttered for over 70 miles from the coast, had fallen into disuse; when railway surveys came to be made little attention was paid to it, and the line was brought inland from Vera Cruz more to the south, along the general line of a newer road whose objectives were the towns of Orizaba and Puebla. This resulted in the railway having some 40 miles of 1 in 25 gradients, including a 12-mile stretch at this figure with 325-350-ft. uncompensated curves, to get it on to the central plateau at about 8,000 ft. Proper surveys made by the Jalapa route many years later showed that a 1 in 50 ruling gradient, compensated, could have been obtained.

Constructional and Working Problems

PROPOSALS for the Vera Cruz-Mexico City line began in 1837, but, apart from about 10 miles of tramway out of Vera Cruz, construction did not begin until 1864, and then only to suit the military needs of the Emperor Maximilian. The line was built by English engineers, though largely to an American survey. The owning English company was nearly ruined by the Mexican Government insisting that construction began at both ends at once, 15,000 tons of rails and other materials having to be hauled 200 miles inland by horse wagons. By 1867 there were 47 miles open from Vera Cruz, in 1868 the 86 miles from the capital to Apizaco were laid, and at the end of 1872 the whole 264-mile route was opened. The last section completed, through Orizaba, was the most difficult, rising 2,370 ft. in 12½ miles. The route was ill-chosen in missing Puebla, then one of the largest towns in Mexico, to which a branch from Apizaco had to be built in the 1870s. American-built locomotives were used for the "easy" 160 miles from the summit to Mexico City, over which the ruling gradient was 1 in 67; but British-built Fairlie locomotives were used over the mountain section, and continued, with larger and heavier batches, culminating in the 138-ton 0-6-6-0s of 1911, by Vulcan Foundry Limited, until the worst 30 miles of the mountain division were electrified at 3,000 volts d.c. in the early 1920s.

3-ft. Gauge

WHEN narrow-gauge railways are under discussion little notice is ever taken of 3-ft. gauge lines. Even so important a book as the *Directory of Railway Officials & Year Book*, in listing principal gauges and the chief places where they are used, mentions only Eire and Northern Ireland, though there are less than 150 miles in those territories. Yet there are over 1,400 miles in Mexico, 770 of them operated by the National Railways; and over 4,000 miles throughout the world. Practically all is in the northern part of South America and in Central America; though Hawaii has 20 miles, and the Denver, Rio Grande & Western Railroad still has the remnants of one of the most important 3-ft. gauge systems ever worked, and one laid originally with rails of only 30 lb. and costing only £3,300 a mile to build. Its early success led to the American Convention of Railway Engineers adopting 3 ft. as the standard for American narrow-gauge lines. Last century there were also lines of this gauge in Nova Scotia, some worked by Fairlie locomotives. But the principal systems now, apart from the Mexican lines, are located in Colombia (795 miles), Peru (300 miles), Guatemala and Salvador (900 miles), Honduras (286 miles), and Panama and Venezuela; and the Majorca Railways built to the metric equivalent of 915 mm.

Another Case of Irregular Starting

THE accident at Newcastle Central on August 17, 1951, inquired into by Lt.-Colonel G. R. S. Wilson, whose report is summarised in this issue, was another of the collisions, somewhat to the fore of late, where a train has been started from a platform against the fixed signal at danger, after the guard's notification that he is ready to go. Contradictory evidence was tendered on more than one point but Colonel Wilson found no reason to doubt that the starting signal was all the time properly at danger, after considering the interlocking and various controls, proved to have been in satisfactory order. There appears to be a greater risk of an electric or auto train being started irregularly in this way than an ordinary steam train, although the view of signals is, as a rule, better from the former. The report points out that there have been seven cases of this kind in the last three years calling for inquiry, which is not creditable, as there is no difficulty in observing signals before starting. Conditions are quite different from those met with when running, when there may be at times some excuse for a momentary mistake. At starting ordinary attention to duty is all that is required.

Automatic Train Describers for Shenfield Line

IN recent weeks the train describers provided temporarily for the resignalling of the Eastern Region Liverpool Street to Shenfield electrified section have been replaced by a fully automatic system believed to be the largest of its kind ever installed. On the main lines the system extends from Liverpool Street to Romford, and

it also covers the branches from Bethnal Green to Hackney Downs, and from Bow Junction to Gas Factory Junction. Descriptions set up at either terminal are automatically transferred from signalbox to signalbox in step with the progress of the train. The display in each box shows the first, second, and third trains in section, with their descriptions and destinations, and records their arrival at the various controlled signals until the appearance of the "last sent" indication shows that a train has entered the section ahead. An article elsewhere in this issue describes the equipment, which was designed, manufactured and supplied by the Siemens and General Electric Railway Signal Co. Ltd. It is adaptable for convenient installation in boxes with lever frames or relay interlocking panels, and some examples of its versatility in this respect are illustrated. Operating on a constant total impulse system, the apparatus requires only four pairs of line wires between boxes over the four-track main line it serves. An interesting feature of the automatic operation is that a description is transferred to the appropriate instruments if a train is switched from the fast to the slow line or *vice versa* in the course of its journey.

London's Other Underground

FOR 46 years the Kingsway Subway enabled passengers from Holborn to Westminster to dodge the traffic jams of the Strand. The last trams ran through the tunnel on April 5, and a pleasant spectacle is lost to the London visitor. Some recall the excitement of watching trams emerge in the direction of Theobalds Road, and wondering whether a stop on the steep incline would be followed by a failure to restart. Others cherish the memory of the grand and sweeping gestures with which tram drivers habitually manipulate their controllers—so different from the barely perceptible jerks by which the motormen of multiple-unit trains stir their caravans into motion. Riding through the tunnel offered some of the pleasure of a footplate trip by looking through the door on to the driver's platform. But the supreme spectacle was surely to see a tram taking to the tunnel from the north. Perhaps it would pause a moment on the steep incline, waiting to be beckoned forward by a position-light signal supplied by a well-known railway signal manufacturer. Then it would slide majestically out of sight, like a liner going down the slips or a performing elephant taking the ring on roller skates.

An Encyclopædic Article

OVER a long term of years the Association of American Railroads has striven to place the full facts of the railway position before all sections of the people in all parts of the United States. To that end, its Public Relations Department has used many devices—pictures, advertisements, newspaper articles, lectures at schools or addresses to public assemblies, and a weekly radio programme, known as "The Railroad Hour." As many Americans revel in figures, railway statistics are presented without stint in tables that are easy to understand. The extensive library kept by the Bureau of Railway Economics is freely open to anyone interested in transport. On the top of these activities, the Association recently adopted a novel plan for enlightening the public about the history of railways, the scope of their work and their place in the national economy. It arranged to reprint the article on railways from the 1951 edition of the "Encyclopædia Britannica," and anybody can obtain a copy free by writing to the A.A.R. at Transportation Building, Washington, 6, D.C.

The reprint is a solid treatise of 39 large pages and for the most part gives a factual account of the 781,000 route-miles of railway, which are distributed over seven continents. The United States owns 29 per cent. of that mileage, though it has only 6 per cent. of the world's population and 5 per cent. of the land area. So in this new edition of the famous Encyclopædia, an exhaustive account of the U.S.A. railways fills 25 pages, while two-and-a-half pages towards the end of the article suffice for railways of Great Britain and even less space is allotted to the railways of Continental Europe. In previous editions British railways had pride of place, but in existing conditions there is much more scope for experiment and development in the United States.

The large expenditures on additions and betterments to U.S.A. railway properties, the wonderful improvement in operating efficiency since 1921 and changes such as the substitution of diesel traction for steam motive power are subjects on which a great deal can be written. The authors of the Encyclopædia article have taken their opportunity and, with the aid of material assembled during Dr. J. H. Parmelee's long directorship of the Bureau of Railway Economics, have reviewed every phase of the railway industry from the end of the first world war to 1949. Already one or two traffic trends have altered suddenly, but Dr. Parmelee's annual Review of Railway Operations, available in April, will bring the facts and statistics contained in the article up to date. We have to wait longer for the survey of British Railways' operations in 1951, which forms part of the British Transport Commission's annual report.

British Transport Commission Traffic Receipts

FOR the third four-week period of the year, to March 23, British Railways total traffic receipts were some 13·6 per cent. in excess of the corresponding figure for 1951. Mineral receipts were nearly 30 per cent. above those for Period 3 of last year, coal traffic receipts 23 per cent., and mechandise 22 per cent. This must be considered in the light of the increases in rates amounting to 21 per cent. since Period 3 of 1951. It shows, however, a considerable increase in mineral traffic, even allowing for the low tonnages in the Spring of last year caused by the operating difficulties then prevailing. Merchandise receipts at £9,048,000 compared with £8,534,000 for the preceding period, mineral receipts at £3,346,000 with £3,314,000, and coal class receipts at £8,359,000 with £8,316,000. All three headings, however, show progressive increases over the first three periods of the year.

—	Four weeks to March 23		Incr. or decr.	Aggregate for 12 weeks		Incr. or decr.
	1952	1951		1952	1951	
	£000	£000	£000	£000	£000	£000
British Railways—						
Passengers	6,860	7,432	− 572	19,245	18,936	+ 309
Parcels, etc., by passenger train	2,702	2,469	+ 233	7,751	7,076	+ 675
Merchandise & livestock	9,048	7,393	+ 1,655	25,600	21,523	+ 4,077
Minerals	3,346	2,593	+ 753	9,933	7,837	+ 2,096
Coal & coke	8,359	6,797	+ 1,562	24,595	20,151	+ 4,444
	30,315	26,684	+ 3,631	87,124	75,523	+ 11,601
British Road Services	6,186	5,946	+ 240	17,814	16,672	+ 1,142
Road Passenger Transport: Provincial & Scottish—						
Buses, coaches, & trolleybuses	3,106	2,849	+ 257	8,879	8,085	+ 794
London Transport—						
Railways	1,394	1,223	+ 171	3,823	3,625	+ 198
Buses & coaches	2,879	2,419	+ 460	7,894	7,015	+ 879
Trolleybuses & trams	752	741	+ 11	2,074	2,210	− 136
	5,025	4,383	+ 642	13,791	12,850	+ 941
Inland Waterways—						
Tolls	80	67	+ 13	233	180	+ 53
Freight charges, etc.	101	76	+ 25	291	218	+ 73
	181	143	+ 38	524	398	+ 126
Total	44,813	40,005	+ 4,808	128,132	113,528	+ 14,604

British Railways passenger receipts show a marked drop compared with last year of some 8 per cent. The explanation lies largely in the incidence of Easter at the end of Period 3 in 1951. This disguises the effects of the applica-

tion to British Railways in the London Area of the Passenger Charges Scheme, 1952, from March 2. The scheme, although it reduced ordinary fares (except on the Tilbury Line) from 2·44d. to 1·75d. a mile, considerably increased season ticket rates, also ordinary Tilbury Line fares. In view of this, and of the high proportion of receipts from the Tilbury Line in British Railways total passenger earnings in the London Area, the application of the scheme might have been expected to offset the higher receipts due to the incidence of the Easter holiday last year, when Maundy Thursday, with its heavy monthly return bookings, and Good Friday, with its excursions, fell within Period 3. The higher fares since March 2 may, however, have caused some falling off in railway travel.

The same considerations apply to London Transport receipts. All three forms of transport, however, show increases over the preceding period and over Period 3 of last year. Underground receipts rose some 15 per cent., bus and coach 16, and trolleybus and tram receipts some 15 per cent. compared with Period 2, which, even allowing for seasonal increases, shows the effects of the latest rise in fares.

BRITISH TRANSPORT COMMISSION TRAFFIC RECEIPTS

Percentage Variation 1952 compared with 1951

	4 weeks to March 23	12 weeks to March 23
British Railways—		
Passengers	− 7·6	+ 1·6
Parcels	+ 9·4	+ 9·5
Merchandise & livestock	+22·3	+18·9
Minerals	+29·0	+26·7
Coal & coke	+22·9	+22·0
Total	+13·6	+15·3
British Road Services	+ 4·0	+ 6·8
Road Passenger Transport	+ 9·0	+ 9·8
London Transport—		
Railways	+13·9	+ 5·4
Buses & coaches	+19·0	+12·5
Trolleybuses & trams	+ 1·4	− 6·1
Total	+14·6	+ 7·3
Inland Waterways	+26·5	+31·6
Aggregate	+12·0	+12·8

Canadian Pacific Railway

A RECORD tonnage was carried by the Canadian Pacific Railway in 1951, and gross earnings, at $428,911,639, were $50,334,951, or 13 per cent. more than in 1950, and higher than in any previous year. As Mr. W. A. Mather, President of the company, points out, however, in the annual report for the year, working expenses increased at a greater rate than revenue. The result was that net earnings from railway operations were far below the level needed to provide a sufficient contribution to dividends and a reasonable amount for reinvestment in railway property.

Some of the principal results were:—

	1950	1951
	$	$
Passenger revenue	34,927,310	37,810,166
Freight revenue	306,055,749	351,435,788
Miscellaneous—		
Gross revenue (incl. taxes)	378,576,688	428,911,639
Working expenses	340,556,331	402,098,807
Net earnings	38,020,357	26,812,832
Other income	23,236,264	29,343,635
Fixed charge	13,389,610	12,848,997
Net income	47,867,011	43,307,470
Dividends	23,488,648	23,428,010
Balance	24,378,363	19,879,460
Operating ratio (per cent.)	85·51	88·93

An aggregate sum of $72,000,000 was nevertheless spent on improvements and additions to railway properties. These capital expenditures were part of a five-year programme designed to lower the costs of operation, replace worn-out facilities and enable the company to meet the needs of an expanding economy for efficient and modern transport. Capital outlays of $119,000,000 have been made during the past two years to implement this programme, and further substantial expenditures will be required to complete it. Railway net earnings were again adversely affected by the time required to obtain authority to increase rates in the face of rising costs. Application was made in December, 1950, for authority to make an immediate increase of 5 per cent. in freight rates. In April, 1951, an amending application was filed for authority to make an additional increase of 14 per cent. A judgment was issued in July authorising an increase of 12 per cent. on an interim basis. Not until after the close of the year was a final decision rendered granting an increase of 17 per cent. in lieu of the interim increase of 12 per cent. The total increase applied for, including an additional increase asked for by a second amending application in October, 1951, to provide for the defence surtax, was approximately 23 per cent.

These increases in freight rates were not applicable to grain and grain products moving within Western Canada, which accounted for the greatest single item of tonnage on Western lines, moved for the most part at rates which are at 1899 level. In 1951 grain and grain products accounted for more than 40 per cent. of the traffic in Western Canada but, because of the low rates at which they moved, provided only 20 per cent. of the freight revenues of Western lines. The maintenance of such rates continues to result in the imposition on other commodities of higher freight rates than would otherwise be levied.

As shown, freight earnings provided 82 per cent. of gross earnings, a larger proportion than in any previous year. There was an increase of $45,000,000 over 1950, of which more than half was the result of increased traffic volume. Traffic volume in terms of tons carried was a record, and was 12·5 per cent. greater than in 1950. Passenger earnings increased by $3,000,000. Although there was a slight decrease in the number of passengers carried, passenger miles increased 8 per cent., largely as a result of increased movements of the armed forces and immigrants. Working expenses at $402,000,000 were higher than ever before. The increase was brought about by greater volume of traffic and by higher rates of wages, prices of materials, and taxes. The gross revenues of air lines increased 52 per cent. The net profit was $1,100,000, an increase of $880,000.

Important amendments to the Railway Act, arising from the report of the Royal Commission on Transportation, became law on December 21, 1951. These amendments include a declaration that it is the national freight rates policy to equalise freight rates throughout Canada so far as is reasonably possible, with certain exceptions. One provision is for payment to the company of the cost of maintaining the main line between Sudbury and Fort William and to the Canadian National for the cost of maintaining track of an equivalent extent. These payments are to be applied by way of reduction in the level of rates applicable to traffic moving over the " rail links " between Eastern and Western Canada.

In October and November, the Queen and the Duke of Edinburgh toured Canada; the Royal Train provided by the C.P.R. and C.N.R. travelled more than 3,000 miles over C.P.R. lines. The Royal travellers returned to England aboard the *Empress of Scotland*, flagship of the C.P.R. fleet.

New motive power placed in service during the year consisted of 42 diesel-electric units, of which 28 were assigned to the mountain territory between Calgary and Revelstoke. At the end of the year 232 diesel-electric units were in service. The construction of facilities to provide for the maintenance of diesel-electric power was completed on the Schreiber Division, and is in progress between Calgary and Revelstoke.

Wagons delivered in 1951, numbering 5,024, exceeded deliveries in any year since 1929. During the past five years more than 17,000 new wagons have been placed in service. Additional tracks and other facilities were provided at the new classification yard in the Montreal area to expedite marshalling and inspection of trains. Automatic block signal systems were installed during the year on 108 miles of line, bringing the total to 2,549 miles.

The operation of the *Empress of Scotland* on West Indies cruises marked the re-entry of the company into the cruise business. The *Princess of Nanaimo*, a new coastal vessel

with a daytime capacity of 1,500 passengers and 100 motor-cars, went into service between Vancouver and Nanaimo. The general cargo vessel *Yukon Princess* replaced the *Nootka* on the Vancouver-Skagway route, and a new weekly service was inaugurated between Vancouver and Prince Rupert to meet the demands of the development of the Kitimat area.

Capital appropriations amounting to $16,700,000, in addition to those approved at the last annual meeting, were authorised during the year. Approval will be requested also for capital appropriations of $73,900,000 for 1952. The appropriations for new rolling stock make provision for 50 diesel-electric units, 4,750 wagons, 25 vans, 25 refrigerator vans, and 390 service vehicles. The diesel-electric units include 32 road units required to complete the conversion to diesel operation of all services between Calgary and Revelstoke.

Great Northern Railway (Ireland)

THE principal results of the Great Northern Railway (Ireland) for the years 1949, 1950 and 1951 are given in the following table:—

	1949	1950	1951
No. of passengers	7,159,085	6,034,025	6,246,652
Passenger receipts	£1,270,407	£1,102,023	£1,115,127
Goods tonnage	1,506,604	1,458,735	1,370,446
Goods revenue	£1,216,335	£1,221,981	£1,178,408
	£	£	£
Railway net receipts ...	(Dr.) 216,013	(Dr.) 232,486	(Dr.) 613,037
Road ,, ,, ...	91,248	74,028	16,993
Hotel ,, ,, ...	6,472	4,145	(Dr.) 1,264
Total ,, ,, ...	(Dr.) 68,467	(Dr.) 105,879	(Dr.) 558,951
Fixed charges	116,025	115,092	116,333
Deficit	184,492	220,971	675,284
Bal of reserve for war damage contributions ...	100,714	—	—
Total deficit	83,778	220,971	675,284
Debit bal. brought forward from previous year ...	(Cr. 7,787	75,991	296,962
Balance	(Dr.) 75,991	(Dr.) 296,962	(Dr.) 972,246

Some particulars from the report of the company for the year ended December 31, 1951, were given in an editorial note in our February 22 issue. The report also alludes to the company's inability in the early part of the year to provide for the purchase of materials needed for maintenance and renewals. As a result speed restrictions and other safety precautions had to be imposed for a time. These measures were partially relaxed by the conclusion of an agreement with the two Governments on October 1 for financing deficits incurred by the company in current operations, and the purchase of materials and equipment. The company instituted road services at the end of the year in substitution for the railway services previously operated by the Dundalk Newry & Greenore Railway, and, by arrangement with the Government of the Republic, took over the hotel at Greenore.

Track Stability on the Netherlands Railways

THE science of soil mechanics is of greater importance in Holland than in almost any other country because the bearing capacity of the ground is generally low. There is a central laboratory and soil mechanics service at Delft, somewhat similar to that of the National Physical Laboratory at Teddington, but in addition the Netherlands Railways administration has its own organisation to study the subject from its particular angle. As mentioned in a previous editorial article in our April 4, 1952, issue, this work is the responsibility of the Track Construction Section of the Civil Engineer's Department. That editorial referred to the first part of a series of notes made by Mr. J. F. G. Inglis, entitled " Observations on a Visit to the Netherlands Railways in 1950," and discussed by the Institution of Civil Engineers on January 29 last. The second part of his notes was devoted to the activities of the Track Construction Section in the field of soil mechanics and some of the measures it has taken to stabilise the track.

Stable formation and foundations of bridges and buildings is the chief concern of the section. Foundations usually require either a raft or piling. For the preliminary exploration of the quality of the soil, two standard field tests are made by specially-trained inspectors. The first involves the measurement at intervals of the resistance to pressure when and as a cone of standard diameter and angle is forced down into the ground. The other is the sampling of the soil taken from borings at different depths; the samples are subsequently dried out and examined. Results of the tests are carefully recorded in standardised form, enabling reasonably accurate predictions to be made in future where conditions are similar.

Three track construction and stabilisation works were in hand in 1950. A new 6½-mile double line had to be constructed between Rotterdam and Nieuwerkerk, mainly over polder land 15 ft. below sea-level. After preliminary survey, cone-testing, and sampling, it was decided to excavate to a depth of 15 ft. in places, and replace the unstable material with sand. A " pond " was first excavated by dragline, and into it a fleet of dredgers, barges and tugs was hauled down from a nearby canal. Bucket dredgers then worked their way along the line of the new railway, discharging their excavated soil into barges, whence it was pumped by suction dredger to raised depots. There the deposited clay and peat were disposed to ensure subsequent fertility. The canal so formed was filled to ground-level with river sand, some pumped from points five miles distant. To avoid over-stressing the soil on each side, the sand intended for the new railway embankment was pumped into and drained in depots spaced at intervals along the new alignment, though this caused some local heaving in the surrounding land.

The second work was the strengthening of the formation under the double-track main line between Gouda and Oudewater where it is on embankment over peaty subsoil. Sand was first deposited on both sides of the bank as a toe-counterweight to prevent further slipping. A temporary track was then laid along one of these sand " dams " to pass traffic and enable complete possession to be obtained of one track. The old subgrade was next scraped away and wooden shutter-boards were fixed about 11 ft. apart. Beach ballast was then placed between them to a depth of 16 in., and a light steel mesh was laid near the bottom of the ballast, which was concreted by pumping in cement and sand grout to produce " no-fines " concrete to form a continuous slab. When this had set, 7 in. of old ballast was spread over it and consolidated with 3-ton compaction machines of the vibrating-plate type. Finally 4 in. of new ballast was laid under the sleepers and consolidated by a Matisa tamper running over the track.

In the third operation outlined by Mr. Inglis, though an electrified double line was strengthened and reballasted, traffic was maintained by laying a temporary track at one side complete with overhead conductor. The drainage ditch at one side was filled with sand and the temporary track was laid over this; a new ditch was cut beyond the old one. The overhead conductor wire was carried on temporary cantiliver brackets extending over the temporary track and bolted to the existing portal frames. The permanent tracks were relaid in turn after the old track had been lifted and the old ballast to a depth of 18 in. had been scraped to one side with a ballast plough. The subgrade was consolidated with a 3-ton vibrating-plate compactor and new ballast was laid under the new track and compacted by rolling with a Matisa tamper.

The 3-ton compactors are owned by the administration and hired out to contractors, but the Matisa tampers are worked by special mobile relaying gangs to complete such reballasting work. The ballast plough consists of a long-wheelbase four-wheel unsprung wagon with two vertically-hinged blades on each side, which can be raised or lowered, extended or withdrawn, or tilted by compressed air. As it runs on one track to scrape the ballast of an adjacent track, it can be used only on double line sections or in multiple sidings. A clean cut and sweep 10 in. deep can be made. Another machine seen was a small bulldozer with a scoop-blade, which can pick up dirty ballast from the track and load it directly into dumpers. In favourable conditions it can therefore do the work, on a small scale, of a bulldozer and a grab or dragline, and is easily handled close to the track.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

The Value of Locomotive Names

March 28

SIR,—I have long felt that the value of well-chosen locomotive names as a source of goodwill towards railways is not fully appreciated or understood. The vital point that a name should convey personality is lost when a plural name such as *Straits Settlements* is selected. Names like *Banshee, Courageous, Lady of the Lake,* and *Sir Galahad* are ideal because they not only convey personality but are in harmony with the spirit of a steam locomotive. The pioneer days established a tradition of names that can hardly be bettered, such as *Lancashire Witch, Phœnix,* and *Comet,* but I wonder why *Rocket* has never (so far as I am aware) been repeated.

A "Himalayan" class would offer a fine choice of names taken from mountain peaks. The suggestion of enduring individuality would suit a steam locomotive well. After *Everest* could follow names like *Kamet, Nanda Devi, Chokola, Kanchinjunga,* and many more, which would be appreciated by Indian and Pakistan sentiment.

The name of a railway engine is not a frivolous ornament but the continuance of a tradition that grew with ships and came to the railway through the stage coaches. In the West Riding even horizontal steam engines in textile factories bear names. They are a symbol of that essential pride which binds together owner and management, worker and customer, in a joint enterprise, which is just what the railways need today.

Yours faithfully,

WILLIAM B. STOCKS

22, Heatherfield Road, Marsh, Huddersfield

[Our correspondent's suggestions for a class named after Himalayan peaks is interesting, though the use of, say, the name *K2* might give rise to confusion with motive power classification !—ED., *R.G.*]

Hollow Axles

March 27

SIR,—I read Mr. Poultney's article in your February 15 issue, and while agreeing that the advantage of weight reduction is worth gaining by the boring of crank pins, I do not think the same reasoning should be solely applied to the boring of steam locomotive axles. In service somewhat different sets of conditions arise, and stresses which are imposed on crank pins are not altogether similar in character to those which occur to axles.

The two-cylinder steam locomotive is really two engines which are coupled together, and synchronised by means of a connecting axle. It is well known that no two cylinders of one locomotive behave in the same way, or exert exactly the same power, even though they may be of the same dimensions. This is due to unseen differences in manufacture and erection. Similarly, the two rails on which the wheels of a locomotive run have, in practice, differences of level, condition, and resilience. These conditions impose on the axle unmeasurable stresses, which do not adversely affect the crank pins. The major stress inflicted upon the axle by these conditions is that caused by torsion.

Most locomotive engineers, with running experience, will have encountered failures through broken or bent connecting and side rods. They may agree that this type of failure can be caused through momentary changes in the angular relationship of the crank pins on each side of the locomotive. These changes in angularity can be caused through wheel slip at any speed, because of the variation of adhesion between the two sides of an engine. This difference is emphasised when sand is applied to the rails, because the feed and quality is never uniform to both sides.

The boring of axles can be useful to secure metallurgical advantages through heat-treatment, but it is doubtful if, by boring large holes, as advocated in Mr. Poultney's article, the saving in weight, which after all is small in comparison with the axle load, is justified at the expense of torsional strength.

The Association of American Railroads (A.A.R.), a body which has performed notable service for railway engineers, made an investigation of hollow axles some years ago, and has since kept abreast of developments. Their findings and recommendations have been endorsed by engineers in other parts of the world. According to A.A.R. recommended practice in 1947, an axle with a 10-in. dia. wheel seat, and 9½ in. dia. at the slimmest section, would have a hole not greater than 2 in. in dia., as compared with Mr. Poultney's 4 in. Such a wide variation in recommended practice impels me to say that the size of axle bores should be carefully and objectively considered before large diameters are decided on, lest we lose the inherent robustness of the steam locomotive, in pursuit of unnecessary weight reduction.

Yours faithfully,

H. A. JOHNSON
(Formerly C.M.E., Gold Coast Railway)

473, Bourke Street, Melbourne, C.1

The Ford Accident

March 27

SIR,—I crave your indulgence to be allowed to make the following comments, arising out of your footnote to my letter in your March 21 issue.

With all deference, I submit that Rule 39a has nothing to do with the case. This rule is merely designed to provide, *at all times,* a salutary check to a driver before allowing him to proceed to the last stop signal where he is expected to be held finally for any period. It is, or should be, in constant observance daily throughout the country.

Reference to the principle of 440 yd. minimum between trains is not, I think, to be found in the Rule Book at all, but is prescribed in block telegraph rules, whose whole object is to prevent two trains ever being in a section and to maintain a minimum distance of 440 yd. between trains at all times *except where specially authorised.*

It is the special authorisations which give me cause for disquiet. I may be pernickety, but public safety comes first on a railway and avoidance of delay a long way behind. Only recently I was in a main line train which was allowed to approach a junction where the inner home is some 150 yd. clear of the actual fouling point. At the same time another train was crossing the junction in front of us *and we were actually still moving.* I admit we were either checked or stopped at the outer home situated the usual 440 yd. to the rear; I cannot remember which. No doubt the practice is authorised, but is it right ?

Yours faithfully,

BERNARD DE NEVERS

14, Berners Street, London, W.1

[The block telegraph regulations do not prescribe a minimum of 440 yd. between trains everywhere at all times but only under certain circumstances. The purpose of the block is to ensure what, in fact, official requirements ask for, namely an *adequate* distance between trains, but what that is can vary with the conditions, not only from place to place but from time to time. If fog comes on and the fogmen have not reached their posts, then not even 440 yd. overlap is considered adequate and the length of the block section in advance becomes added. We do not know, of course, what special instruction, if any, is in force at the location our correspondent has in mind and in any case, unfortunately, instructions are sometimes disobeyed, but it would be impracticable to work our traffic and maintain a 440 yd. minimum distance at all times.—ED., *R.G.*]

THE SCRAP HEAP

London's Luxury Transport

Mr. George James Gwynn, driver of one of the London buses on a goodwill tour of the United States, expressed doubt today whether he is creating much good will.

"After seeing these buses Americans are dissatisfied with their own," he said. "After we give them a spin they grumble over the vehicles they've got to drive to work in."—*From the "Daily Mail."*

Best Wishes from the Loudspeaker

Thank you, the Hammersmith station porter who brightened the rush-hour gloom by making his announcement on the station relay thus: "Uxbridge train on platform two. Next stop Acton Town, passing Ravenscourt Park . . . And the best of luck!" A little more of this would make even the Underground comparatively tolerable.—*From a letter to "The Evening News."*

Royal Funeral Coach

The coach which conveyed the body of King George VI from Sandringham to London and thence to Windsor was built at Doncaster in 1912 and was also used for the funerals of Queen Alexandra and King George V. It is painted black with mouldings picked out in purple, and bears on each side a hatchment

The hatchment of the arms of King George VI on the funeral coach

of the Royal Arms surrounded by the Garter.

The Arms were painted at Stratford by Mr. D. W. Bedford and Mr. D. W. Tarrant, Coachpainters & Writers, who served their apprenticeship at Stratford works and have studied heraldry and signwriting at West Ham Institute. They began work on the hatchment at 7 a.m. and finished at 9.15 p.m. the same day.

Work on the appointments of the coach was carried out under the supervision of Mr. S. Russell, Carriage & Wagon Works Manager, Stratford, Mr. G. V. Bond, Chief Foreman, Carriage Paint Shop and Mr. W. E. Blow, Foreman Trimmer. This is the second occasion upon which Messrs. Bond and Blow have prepared this coach for a royal funeral. They began at 11.30 a.m. on February 8 and worked through the night, finishing at 3.30 p.m. the next day.

Suburban Sprawl

But when a city begins to have a core where a "gent" is as unusual a figure as a kangaroo, and is surrounded by a ring of residential suburbs from which and to which the daily breaders are sucked in and out like marine animalculæ following the tides, then that city is in danger of a partition of the soul, a kind of civic schizophrenia. This position has begun to arise in all the big cities; and the bigger the city, the more decisive the split.—*From an article by Mr. Walter Elliot in "The Daily Telegraph."*

First Locomotive for Ethiopia

"On the morning of the second day out, on the borders of Lake Kilole, the Emperor received news that the locomotive was nearby. At last there came to us the chanting of thousands of men. Then they came trooping down the dusty track that had been cleared over the hill. They dragged the engine behind them by cables. Others behind prevented its too rapid descent. Next there came extra wheels and other parts, carried by porters. The men seemed intoxicated with a sort of religious fervour as, singing, they approached and marched past their ruler. There were thousands of them. An Ethiopian banner fastened to the body of the locomotive fluttered above the crowd.

"When the big machine appeared at last on the summit of the gorge, a terrific shout rent the air. The Emperor stood up, took a step forward, and made a gesture of salutation.

"'I thought it would be bigger,' was his comment when he saw it at closer range."— *From an eyewitness's account of the arrival in* 1904 *of the first locomotive in Abyssinia, quoted in the General Motors staff journal, "Streamliner"*

Due Notice

When a 16-year-old boy was summoned for trespassing on the railway at Upminster, an official said there was a warning board near the spot where the boy climbed the railings, but the boy said he did not see it.

Asked how long the notice had been there, the official said: "Since the days of the old Midland, about 1844." The boy was fined 5s.—*From "The Star."*

[The first railway to reach Upminster was the London Tilbury & Southend line from Barking, in 1885. The Midland Railway Company was formed in 1844, and the M.R. absorbed the L.T.S.R. in 1912. The board would seem to have been placed by the Midland after 1912.—ED., *R.G.*]

Locomotives for India

Exactly a hundred years ago, in 1852, the first locomotive was despatched from the Vulcan Foundry for service in India. The order was for eight 5 ft. 6 in. gauge 2-4-0 passenger engines and these were used to open the first public railway in India from Bombay to Thana—part of the G.I.P. Railway. . . . Altogether nearly 2,750 Vulcan locomotives have been supplied to India, which is equivalent to an average of more than one per fortnight for a hundred years!—*From the "Vulcan Magazine."*

"Do Not Fail"

(*The slogan "Don't fail to go by rail" is being used by the Railway Executive on some of its envelopes*)

"Do not fail
To go by rail"
(I simply won't
Use the horrid word "don't"),
The envelope said
In letters of red,
With a letter to me
From the P.R. and P.

My dear Sir,
I shall incur
The cost of a ticket
To the Wood, Bricket.

I would go often
If fares would soften.
(The Cockney will say,
In his own sweet way,
"If fares were lower
I would go mower").

But it is my purse
That I must nurse.
A monthly return
Will be quite a burn
By the time we see
The Summer T-T.

So please, R.E.,
Please will you see
What you can employ
To help us enjoy
Those expensive trains
By various lanes—

More cross-country runs,
From Dawlish to Duns,
Berwick to Barmouth
Or Yeovil to Yarmouth,
Reading to Retford
Or Thurso to Thetford.

Then you will find,
If you are so kind,
To go by rail
We shall not fail.

But we'd rather prepare
For reduction in fare;
That *is* good advice,
For we'd all travel twice.

W. J. S.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Royal Commission's Investigations

The Royal Commission appointed to inquire into the railways has begun sittings in Auckland. The questions it is to report on are:—

The adequacy and efficiency of all services operated by the Railways Department, and of its motive power, rolling stock, road service vehicles, workshops, and similar establishments;

The adequacy of the existing staff and steps, if any, necessary to conserve and augment the staff or improve its location;

Competition by other transport operations, the effect of subsidies on services, and the desirability of delineating a sphere of operations for railway services and other transport operations;

The desirability of the abandonment of any part of the railway system or stations;

The adequacy and suitability of the scale of goods rates, passenger fares and all other charges.

SOUTH AFRICA

Suburban Traffic

The number of passengers carried by suburban services steadily increases. During the six months ended September 30, 1951, suburban passenger journeys amounted to 115,773,393, compared with 110,081,606 in the corresponding period in 1950. The number carried on the Witwatersrand service was 56,988,812. The figures for the remaining large urban areas are: Cape suburban, 39,063,826; Durban, 9,774,254; Pretoria, 3,631,938; Port Elizabeth, 3,788,547; and East London, 1,258,506.

The chief difficulty in suburban railway transport is serving the needs of the non-European population of the Witwatersrand, particularly in Johannesburg, where the non-European residential areas lie on the perimeter of the city. This traffic to and from Johannesburg is almost entirely peak-hour traffic, during brief periods in the morning and in the evening. A vigorous effort is being made to bring coaching stock up to the level of the peak-hour requirements to avoid overcrowding of trains.

CANADA

Removal of a Montreal Station

The C.N.R. has completed the removal of Lagauchetiere Street Station, situated in an opening of the Mount Royal Tunnel, Montreal. The station was built in 1918 by the former Canadian Northern Railway as a temporary terminal for transcontinental trains, until a major terminus could be planned, a project which the subsequent formation of the Canadian National Railways caused to be shelved for a number of years.

After the opening of Montreal Central Station in 1943, Lagauchetiere Street Station, which had handled trains to the Laurentians and season-ticket traffic, was turned over to the parcels department. It has been removed to make room for extra tracks into Central Station.

New Line to Kitimat

The Government is to introduce a bill for the construction of the projected line from Terrace to Kitimat, in British Columbia. The line, 46 miles long, will serve the growing new aluminium industry on the west coast.

The C.N.R. will be authorised to spend up to £10,000,000, issuing securities, guaranteed by the Government, to cover construction.

ARGENTINA

Credit for Bolivian Railway

The credit of 36,000,000 pesos granted to Bolivia by the Argentine Government for railway construction in 1952 (referred to in our December 28, 1951, issue) has now been increased to 41,000,000 pesos. The money is to be used in the construction of the Yacuiba to Santa Cruz and Sucre to Boyuibe lines.

Río Gallegos Installations

The Technical Under-Secretary of the Ministry of Public Works has visited Europe in connection with the proposal under consideration to build modern port installations at Río Gallegos, the terminus of the Eva Perón Railway, which connects the port with the Presidente Perón coal mines at Río Turbio.

Increase in Fares

Following the great increase in fares last November, a further drastic increase came into force on March 15. In general the increase is about 30 per cent., but some increases are 70 per cent. On the General Mitre Railway, the single fare to Tucumán has been increased from 125·40 pesos to 163 pesos by ordinary train and to 211·90 by "El Tucumano." On the General Roca Railway, the fare to Mar del Plata by the new air-conditioned express "El Marplatense" has been increased from 150 to 200 pesos. On the General San Martín Railway the cost of a Pullman seat between Buenos Aires and Mendoza has been increased from 50 to 120 pesos.

On all lines the cost of a sleeping berth has been increased from 50 to 75 pesos for any distance. For Pullman seats the same principle applies, with some exceptions such as between Buenos Aires and Rosario, where the increase is from 35 to 60 pesos. The cost of meals has been standardised at 20 pesos in ordinary trains and 25 pesos in expresses. Suburban tariffs are unaffected for the moment, but goods, parcels and luggage rates have been increased in the same general proportion as passenger fares.

Buenos Aires Transport has announced an increase in tram and underground railway fares to a flat rate of 50 cents and trolleybus and bus fares to 60 cents.

UNITED STATES

Philadelphia Ferry Service Withdrawn

The ferry service operated by the Philadelphia & Camden Ferry Company, a subsidiary of the Pennsylvania Railroad, on the Delaware River between Philadelphia and Camden, has been withdrawn. Improvements have been made at Broadway station in Camden of the P. RR., where there is interchange with the Delaware River Bridge line of the Philadelphia Transportation Commission which links Camden with central Philadelphia.

Another New York Terminus

Serious consideration is being given in New York to the possibility of building a third sub-surface terminus in the city. At present the New York Central and New York, New Haven & Hartford trains use the Grand Central terminal, gaining access to the city from the north, along the length of Manhattan Island; the Pennsylvania, Lehigh Valley, and Long Island services use the Pennsylvania terminal, the first two by tunnels under the Hudson River and the Long Island by tunnels under the East River.

The Erie, Reading, Central of New Jersey, Baltimore & Ohio, and Delaware, Lackawanna & Western railways, used by nearly 200,000 season ticket holders coming into and out of New York daily, terminate at Jersey City, and passengers have to cross the Hudson River to and from the city by ferries or by a road tunnel. It is felt that if the trains of these railways could be brought into the heart of the city, considerable economies would result. As the traffic would be mainly morning and evening rush-hour services, at other times in the day much lighterage across the river also could be saved by using a part of the terminus for freight. It is proposed to create a New Jersey-New York Metropolitan Rapid Transit Authority to examine the matter.

ITALY

Reconstruction of Faenza-Florence Line

During the Allied advance in 1943 the line between Faenza (on the Bologna-Ancona main line) and Florence was severely damaged almost from end to end (62¾ miles), and at first it was thought that it would not be rebuilt. The reconstruction of the eastern end, from Faenza, was eventually begun, but the work ceased for lack of funds in 1949, and the line was reopened between Faenza and Marradi, only 21¾ miles.

From 111 ft. above sea level at Faenza the line reaches 1,046 ft. at Marradi, but

the mountain section extends from Marradi as far as Borgo San Lorenzo; its summit, at 1,761 ft., is at Fornello Station, 10½ mls. from Marradi. The reconstruction of this section was recently recommended as urgent, but that of the Borgo San Lorenzo-Florence section, 21 miles, has been postponed.

Borgo San Lorenzo is connected with the Florence-Rome main line by the line to Pontassieve, of 20½ miles, also badly damaged during the war, except its southernmost section between Pontassieve and Rufina. Reconstruction of the Pontassieve-Borgo San Lorenzo link was easier than that of the Florence-Borgo San Lorenzo section, and preference was, therefore, given to it. By a recent decision, reconstruction between Borgo San Lorenzo and San Piero a Sieve, three miles further south, is to be put in hand without further delay as the first step in the eventual rebuilding of the Borgo San Lorenzo-Florence section.

SWITZERLAND

Higher Fares and Luggage Rates

The passenger fares of the Federal Railways were increased by an average of 5 per cent. on April 1. The simultaneous adoption of rationalisation measures, such as rounding off the fares to full decimal units for centimes, or the formation of distance zones for fares beyond 93 miles prevents the principle of the 5 per cent. increase from being strictly adhered throughout. Even where the increase exceeds 5 per cent. the excess will be kept within narrow limits.

The new fares are on an average 20 per cent. more than those before the war.

Luggage rates* are also increased. Rates for bicycles average 5 per cent. more. The fee for left luggage has been increased by 50 per cent. since January 1, from 20 to 30 centimes per article.

FRANCE

Railcars on Branch Lines

In 1949 the S.N.C.F. put into operation on the lightly-trafficked Monastier to La Bastide Saint-Laurent-les-Bains line a number of Renault "VH" type, 300 h.p. railcars in place of steam trains. The first year of railcar operation showed an increase of 35 per cent. in passengers carried. In May, 1951, it was decided to open four new halts on this line. Since then there has been a further increase of 22 per cent. in traffic on the Monastier line. During the same period traffic on comparable neighbouring lines decreased 17 per cent.

Locomotives for Brazil

Amongst the firms building locomotives for metre-gauge Brazilian railways is the Batignolles-Châtillon company at Nantes. The fourth locomotive, a 4-8-4, built by this firm for Brazil, was recently completed and underwent tests on metre-gauge lines in Brittany. The locomotive was moved by road from the works at Nantes to the metre-gauge railway at La Brohinière, a distance of about 100 miles. Two road trailers were used, one a 24-wheel vehicle capable of carrying a load of 80 *tonnes* and the other a 16-wheel vehicle suitable for a load of 46 *tonnes*. These were hauled by two 200 h.p. tractors and the total length of the convoy was 127 ft.; the journey was carried out at an average speed of 2 m.p.h.

Locomotives constructed by other French firms for Brazil have been moved to the port for shipment, and to the Breton narrow-gauge lines, by the S.N.C.F. on well wagons with an overall length of 76 ft. The longest journey thus undertaken by rail has been 506 miles. Experience has shown that transport of locomotives by rail is more economic than by road, except on the shorter journeys.

IRELAND

Lough Swilly Railway Abandonment

The Londonderry & Lough Swilly Railway Company has given public notice that it has applied to the Ministry for Industry & Commerce of the Republic for an order to authorise it to terminate wholly its train services between Buncrana and Bridge End and between Tooban Junction and Forland Point. Notice has been given that if the order is made the company intends to apply for a further order to authorise the abandonment of these sections.

The Transport Tribunals in Northern Ireland and in the Republic will shortly investigate this application. The Northern Ireland Tribunal will be concerned with a closing order for the part of the system situated within Northern Ireland.

Publications Received

Locomotive and Train Working in the Latter Part of the Nineteenth Century. By E. L. Ahrons. Volume Two. Cambridge: W. Heffer & Sons Limited. 9 in. × 6¼ in. 175 pp. Illustrated. Price 18s. net.—This second volume of the articles contributed by the late E. L. Ahrons to *The Railway Magazine* covers the London & North Western, Lancashire & Yorkshire, Midland, North Staffordshire, Furness, Maryport & Carlisle, and North London Railways. Here the reader will find first-hand impressions of the Webb compounds, and recollections of the "Samson" 2-4-0s whose very long chimneys "when the load exceeded three coaches or thereabouts, emitted a violent shower of cinders and sparks over the surrounding country." He can travel in imagination in a Lancashire & Yorkshire express from Bradford to Manchester that encountered so many vicissitudes between Bradford and Sowerby Bridge that at the latter station the author alighted and completed his journey to Halifax on foot. Equally, he can enjoy the account of many smart runs behind famous locomotive classes of the past, and all the time be adding to his store of knowledge of railway history and development from the wealth of anecdote and experience with which the author enlivened his pages in his characteristic style of shrewd and humorous observation.

One measure of the success of a railway book is the extent to which reading it makes journeys over the lines described at the present time a lively and memorable experience. The reader of Mr. Ahrons equips himself to sense while riding in a British Railways train that his journey today is but a stage in a continuing process of evolution, an episode in a history which is rich in achievements and not a few eccentricities.

Standard Costing on Railways. By B. G. Balakrishnan. Published by the Author, D-22, Railway Quarters, Spur Tank Area, Egmore, Madras-8. 7¼ in. × 5 in. 13 pp. Paper covers. No price stated.—This booklet is a reproduction of a paper read by the author at the Conference of the Institute of Railway Accountants & Auditors, at Calcutta in April, 1948. Emphasis has been laid on increasing the work done with the present expenditure and thus reducing the cost per unit, as the bulk of the expenditure on railways is of a "fixed" character. There are useful notes on the application of standard costing to Indian railways and on devising units of service, and an analysis of fixed and variable costs in the budget of Indian Government Railways working expenses for 1951-52.

Wiggin Nickel Alloys.—The current issue of Wiggin Nickel Alloys No. 16, published by Henry Wiggin & Co. Ltd., includes a description of the Rover lightweight, gas turbine, in which Nimonic alloys were used for the flame tube, compressor turbine and power turbine. The booklet, which is illustrated, also includes a description of the manufacture of wire cloth from Monel, nickel and Sconel, together with a range of valves developed by Langley Alloys Limited, available in Monel, Sconel, and Langalloy "R" series of nickel alloys for use in connection with corrosive fluids.

Eyre Smelting Co. Ltd. Jubilee Calendar.—We have received from the Eyre Smelting Co. Ltd. a calendar covering the period April, 1952—March, 1953, which has been produced to mark the golden jubilee of the firm. There are six photographs of Surrey scenes, appropriate to the company's long association with the county.

Efficiency of Diesel Locomotives

Comparative efficiencies of diesel main-line units

By J. L. Koffman

ALTHOUGH the diesel locomotive is firmly established in the shunting field, where in addition to fuel efficiency various other factors had a deciding influence, its advantages for main-line working are by no means so obvious. More particularly on heavily trafficked lines, electric traction is claimed by its champions to have undeniable advantages. The claim is often made for diesel traction mainly on the score of good overall fuel efficiency.

Simply as a converter of fuel energy into power at wheels, the diesel locomotive is at present second to none, but there are factors which detract from this aspect of its performance. Amongst these are considerations of imported *versus* home produced fuel and the view[1] " that the application of diesel traction is only an economic proposition when the price of the fuel oil lies between certain limits, as when this fuel is very cheap it is more economical to burn it under the boilers of steam locomotives which cost two-and-a-half times less than diesel locomotives, and when it is very expensive it is more economical to use steam locomotives."

Another factor which has direct bearing on drawbar efficiency is the weight, because at present the specific weight of road diesel locomotives is still about twice that of their electric counterparts. The claim for one or the other modes of traction based mainly on fuel to wheel efficiency is misleading ; what matters is the fuel to drawbar efficiency, and this will obviously depend on tractive resistance which in turn is a function of speed, weight, and gradients.

The following data were correlated on the basis of an analysis of some 30 European road locomotives. American locomotives were not dealt with, for practices and requirements in U.S.A. differ from those in Europe.

Engine Efficiency

As high-speed engines operate on a cycle which is a mixture of the constant volume (Otto) cycle and the constant pressure (Diesel) cycle, engine efficiency is considered on the basis of this mixed, composite, or dual-combustion cycle.[2] Here part of the heat is supposed to be added and the pressure increased instantaneously at constant volume between 2 and 3. The remainder of the heat is added at constant pressure 3-4 (Fig. 1). The compression and expansion is adiabatic. The theoretical efficiency of the composite cycle is given by:

$$\eta_{th} = 1 - \frac{\left[\frac{q_1}{c_p T_1} \times \frac{r}{\beta} + \frac{\gamma - 1}{\gamma} + \frac{r^\gamma}{\gamma\beta}\right] - \frac{r^\gamma}{\beta}}{(q_1/c_p T_1) \times \gamma \times r^\gamma/\beta}$$

Where: $q_1 = c_v (T_3 - T_2) + c_p(T_4 - T_3)$ [B.Th.U./lb.] of air-fuel mixture; T in deg. abs.; r = compression (or more logically volume) ratio; $\gamma = c_p/c_v$ (here assumed $\gamma = 1{\cdot}4$); $\beta = P_3/P_1$. Values of η_{th} are plotted as function of r and β as well as $\alpha = q_1/c_p T_1$, in Fig. 1. (Due to Prof. Kraemer.)

As an example consider an engine with $r = 14$ and a maximum pressures of 700 lb./sq. in. (with modern highly supercharged engines max. gas pressure of 1,110 to 1,300 lb./sq. in. have been attained), using fuel with a lower heat value of 18,000 B.Th.U./lb. at a fuel/air ratio of 1/18. Let the air intake temperature be 60° F. Consequently, $\beta = 50$ and $q_1 = 1{,}000$ B.Th.U./lb. of air-fuel mixture. With $c_p = 0{\cdot}24$ B.Th.U./(lb.) (°F), $T_1 = 460 + 60 = 520$ deg. R we have $\alpha = 1{,}000/0{\cdot}24 \times 520 = 8$. The resultant value of η_{th} is 0·55.

With railcar engines values of $r = 16$ and $\beta = 65$ are attainable and consequently high values of η_{th} can be achieved. However the actual engine efficiencies fall far short of η_{th} because heat is neither added nor removed in accordance with theoretical requirements. It is practically impossible to control combustion so well, precise and certain as required. The corners of the ideal diagram are rounded off and the area of useful work reduced in consequence. An appreciable amount of heat is lost to and gained from, the cylinder walls at unsuitable points of the cycle. Furthermore, there is incomplete combustion, throttling losses through the inlet and exhaust valves as well as blowby and friction losses.

Whilst with modern engines $\eta_{th} = 0{\cdot}6$ is attainable the actual efficiency will be reduced by the indicated efficiency of about $\eta_{in} = 0{\cdot}77$ and the mechanical efficiency (including losses due to essen-

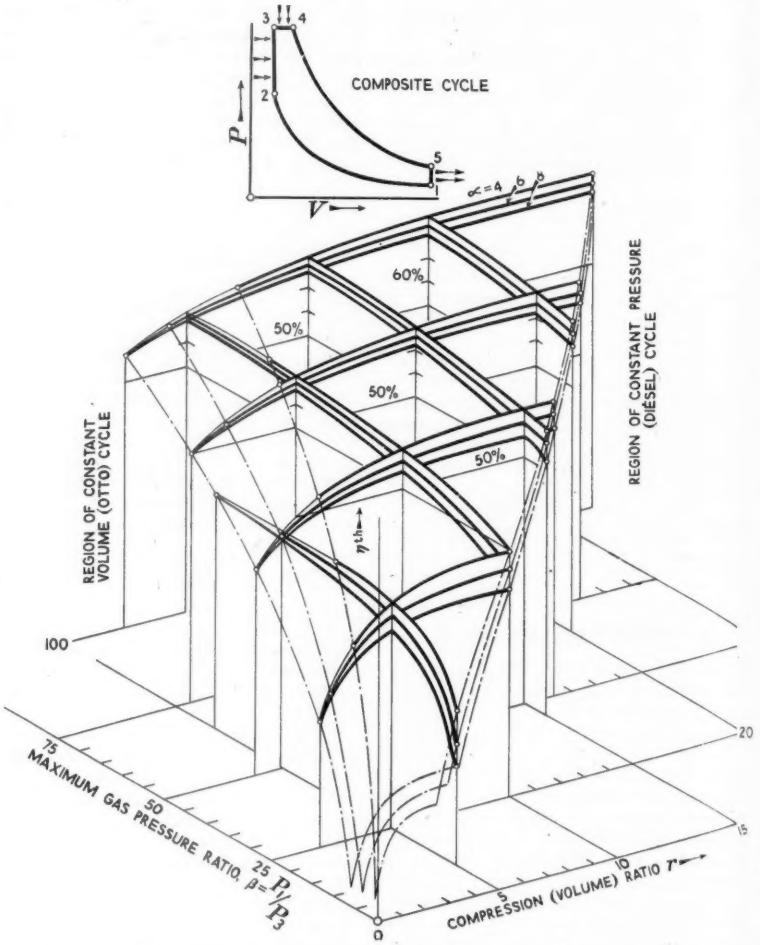

Fig. 1—Theoretical thermal efficiency of composite cycle locomotive

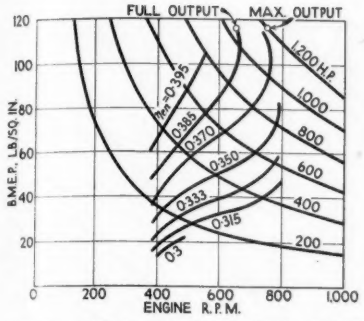

Fig. 2—Efficiency of 8-cylinder 176.8 litres supercharged engine

tial auxiliaries) of about $\eta_m = 0{\cdot}8$ so that the engine efficiency will be

$$\eta_{en} = 0{\cdot}6 \times 0{\cdot}77 \times 0{\cdot}8 = 0{\cdot}375$$

In practice, peak values of 0·39 were obtained with bus engines[3] whilst values of up to 0·4 were achieved with supercharged locomotive engines,[4] but these values were attained for a relatively narrow operating range. Efficiencies ascertained for modern locomotive engines are plotted in Figs. 2, 3, and 4, the data referring to supercharged units incorporating exhaust driven turboblowers.

Losses Due to Auxiliaries

These embrace the losses due to the cooling system, the exhaust and the air cleaners. A carefully proportioned cooling system using a fan capable of maintaining an efficiency of 50 per cent. when installed in the vehicle should not claim more than 5 per cent. of the maximum power output. The exhaust system together with the air cleaner should also not claim more than about 4 per cent. of the ouput. Thus the total installation losses should be in the order of 10 per cent., and this value should also cover the losses due to compressors.

Transmission Efficiency

The losses caused by two gears in mesh are in the order to 1 to 2 per cent. whilst additional losses due to oil churning and bearing friction increase this to about 3 per cent. With modern multi-speed traction transmissions the efficiency is in the order of 85 to 92 per cent. in the lower gears rising to 90 to 94 per cent. in top gear. These values do not include the losses due to axle drives.

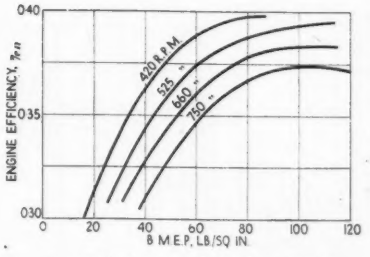

Fig. 3—Efficiency of engine Fig. 2 as function of b.m.e.p.

running at speed. To keep the size of the convertors small (power proportional to r.p.m.[3]) gears are usually used before and consequently after it and this adversely affects the efficiency (Fig. 5b). The efficiency of the gear trains and final drives is taken as 90 per cent. over the entire speed range. The resultant maximum overall transmission efficiency is about 82 per cent. Values of up to 85 per cent. were ascertained with some installations. To provide a transmission ensuring high efficiencies over a wide speed range a hydro-mechanical transmission (Mekydro) was developed for use with goods railcars and locomotives and the performance of this[5] is also shown in Fig. 5b. A high efficiency is obtained at all speeds in excess of 0·2 of the maximum. The efficiency of electric transmissions will be gathered from Fig. 5c.

Here again the efficiency of the gears

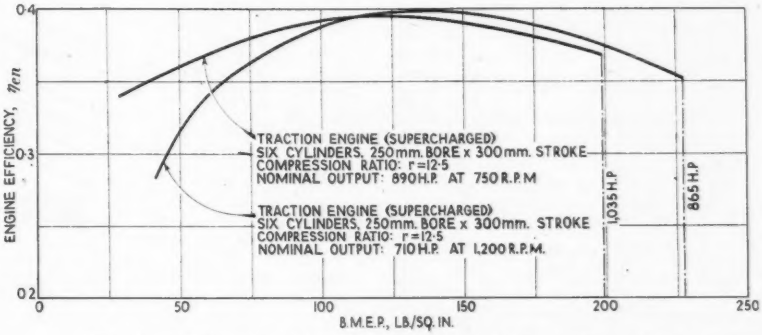

Fig. 4—Efficiencies of highly supercharged locomotive engines

The overall transmission efficiency can be assumed as 84 to 86 per cent. for the lower and 90 to 92 per cent. for the top gear, the mean values being 85 and 91 per cent. respectively (Fig. 5a).

Fluid flywheels have an efficiency of about 98 to 98·5 per cent. at the optimum speed. In the case of torque convertors the parabolic shape of the efficiency curve makes it desirable to use of one unit for starting and a further one or more for is assumed as being constant. The dependence of traction motor gear efficiency as a function of load is plotted in Fig. 6. The maximum overall efficiency is of the order of $\eta_{te} = 81$ to 83 per cent. although up to 86 per cent. were obtained with some installations. The efficiencies of typical locomotive transmission generators and motors are plotted in Figs. 7 and 8 respectively whilst the transmission efficiency of the

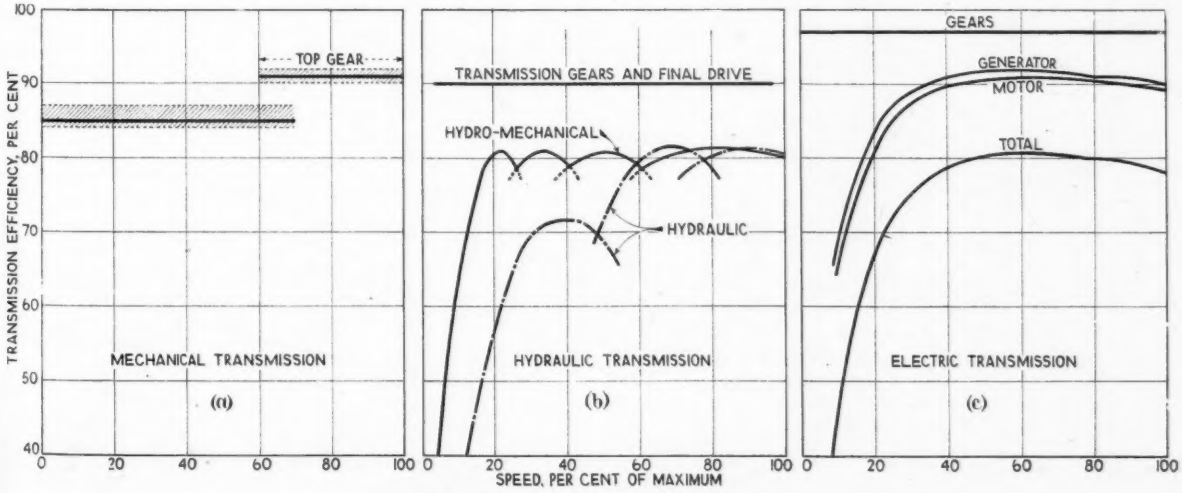

Fig. 5—Transmission efficiencies

Swiss Federal Railways 1,200-h.p. locomotives No. 1001 and 1002 are shown[6] in Fig. 9.

The power thus available at the wheels is about 80 per cent. of the installed value for mechanical and about 74 per cent. for hydraulic and electric transmission. Whilst with mechanical transmission the power available in each gear

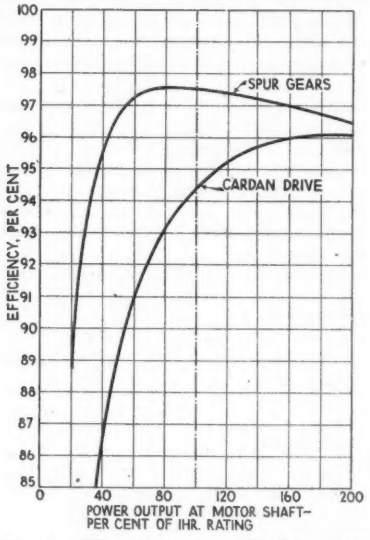

Fig. 6—Electric motor axle drive gear efficiencies

is approximately proportional to engine speed, *i.e.*, wheel r.p.m., full power output can be made available over a wide range of road speeds with the hydraulic and electric transmission.

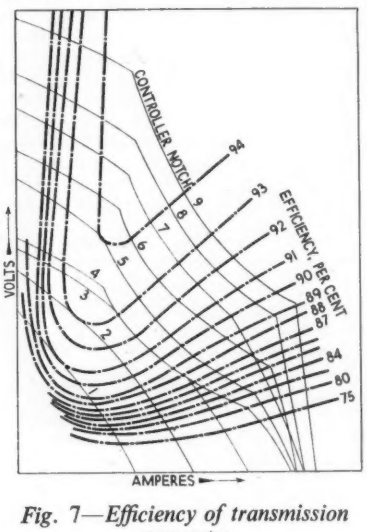

Fig. 7—Efficiency of transmission generator

The type of transmission used and the resultant wheel drive is also of importance on the tractive resistance and consequently the overall efficiency of the locomotive. The tractive resistance R can be determined from:—

$$R = aW_{tr} + bW_d + C_d \times 0{\cdot}26 \times A(V/10) \text{ (lb.)}$$

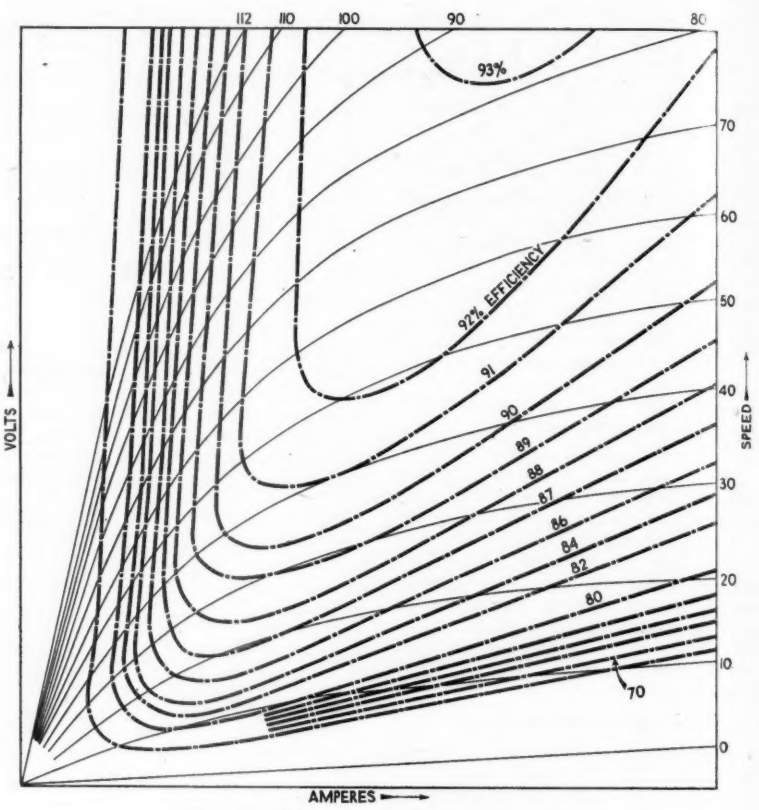

Fig. 8—Efficiency of transmission motor

where $a = 5{\cdot}5$, $4{\cdot}5$ and $3{\cdot}5$ (lb./t) for inside journals, outside journals and roller bearings respectively; W_{tr} = weight on trailing wheels [t], $b = 12$, $15{\cdot}5$, $17{\cdot}5$ and 20 [lb./t) for 2, 3, 4 and 5 coupled axles, respectively. W_d = adhesive weight [t], C_d = drag coefficient = $0{\cdot}4$ for modern diesel locomotives in front of trains, A = frontal area and V = m.p.h.

For locomotives with $W_{tr} = 0$ and individual axle drives:

$$R = {}_0W_d + 0{\cdot}4 \times 0{\cdot}26A(V/10)^2 \text{ [lb.]}$$

Thus the use of connecting rods results in an appreciable increase of tractive resistance and a reduction of the ratio of power or tractive effort at drawbar to installed power or tractive effort. Here it is of interest to compare

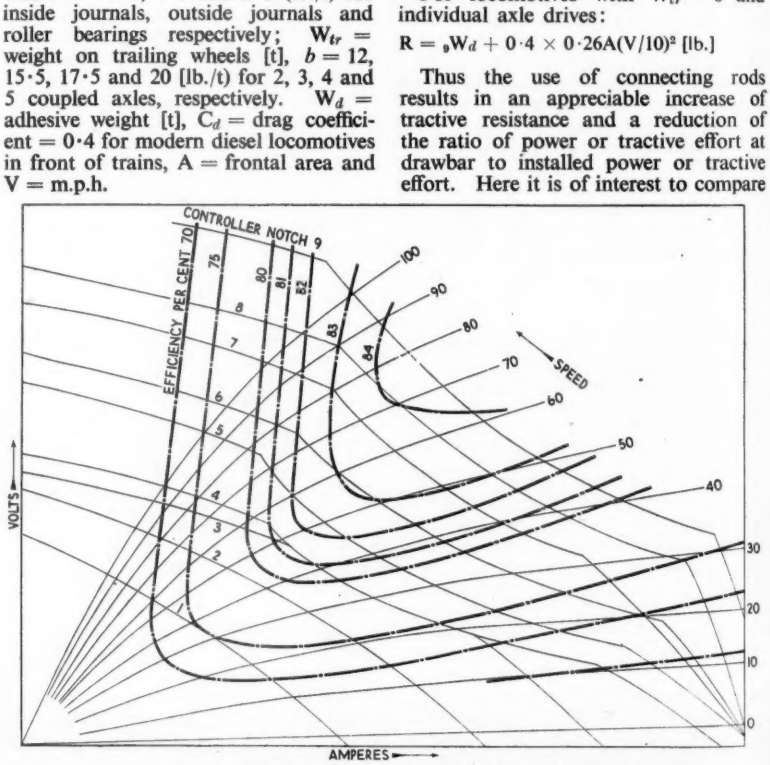

Fig. 9—Overall efficiency of 1,200-h.p. electric transmission

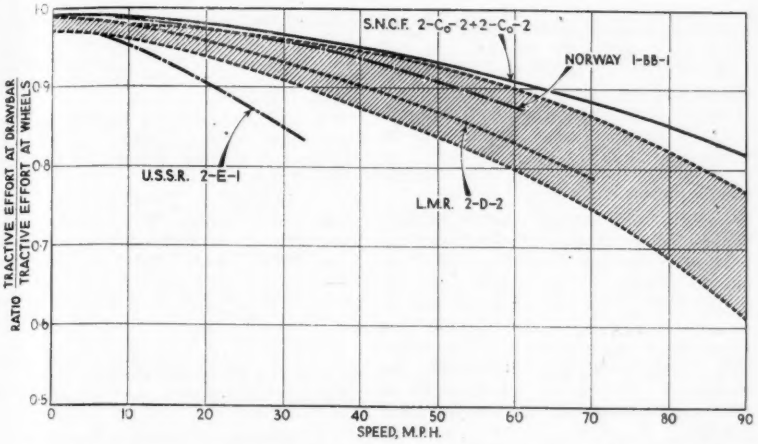

Fig. 10—Average ratios of tractive effort at drawbar to tractive effort at wheels

the power claimed by the tractive resistance of a diesel-hydraulic locomotive of the Norwegian State Railways with that of more conventional units. The 1-BB-1 Norwegian engine is powered by two 1,000-h.p. engines and weighs 85 tons, the adhesive weight being 60 tons. Only one engine is used below 31 m.p.h. whilst a 30-h.p. engine is employed to drive the auxiliaries. The power absorbed by the tractive resistance is shown in Fig. 10 but small as it is, it exceeds that required by the French or Roumanian 4,400-h.p. diesel-electric locomotives, though the specific weights are 102·5, 112·5, and 121 lb./h.p. respectively. Thus it is clear that the evaluation of transmissions solely on the basis of their efficiencies, without considering additional losses due to increased tractive resistance caused by the final drive components, might lead to an inaccurate appreciation of operating advantages or otherwise.

The average ratios of tractive effort at drawbar (T_e) to that corresponding to the installed power (T_i) are plotted in Fig. 10. The values of the band have been derived from an analysis of some 25 locomotives. The Russian 2-E-1 locomotive is an early 130-ton 1,200-h.p. unit incorporating a mechanical transmission.

The specific weights of some locomotives are shown in Fig. 11. The five rather heavy units in the 1,000 to 2,500 h.p. range are the original Russian locomotives whilst the 600-h.p. diesel-hydraulic machine is a German industrial unit. The data indicates that modern locomotives should weigh not more than about 150 lb./h.p.

The overall fuel to wheel efficiency amounts to about $\eta_d = 0{\cdot}375 \times 0{\cdot}8 = 0{\cdot}3$ for mechanical and about $\eta_d = 0{\cdot}28$ for electric and hydraulic transmissions. The drawbar efficiency amounts to about 0·21 to 0·22 in either case at speeds not exceeding 70 m.p.h. on the level. Because of the relatively heavy specific weight, locomotive of identical output, the ratio of overall efficiencies of 1·4 will be reduced, more particularly over steeply graded lines.

To illustrate the point, consider the case of 2,000-h.p. (at the wheels) locomotives. An electric locomotive of this

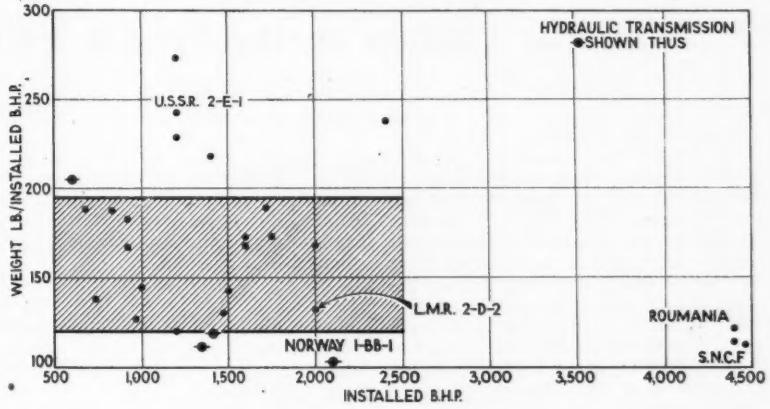

Fig. 11—Specific weights

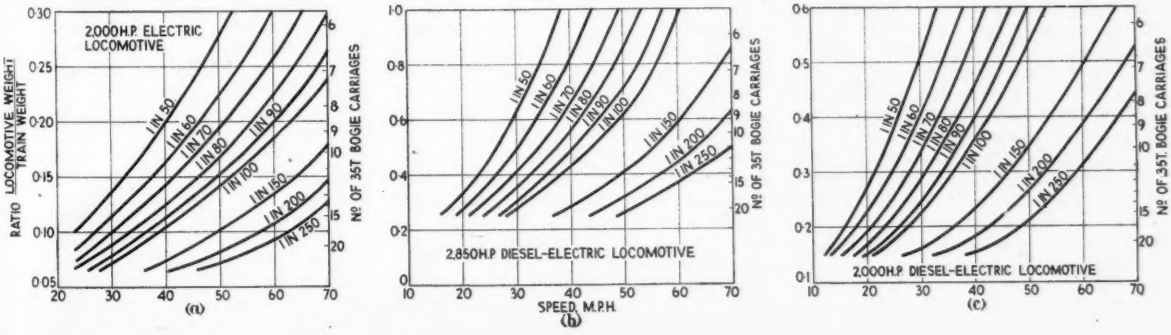

Fig. 12—Locomotive performance

2 to 2·5 times that of electric locomotives, the drawbar efficiency is sensitive to the resistance due to grades.

Comparative Efficiencies

The efficiency of the steam locomotive has been given as 11 per cent. and that of the electric locomotive as about 20 per cent. Neither value compares favourably with the 28 per cent. estimated for diesel locomotives, the ratios being 1·82 for electric/steam, 1·4 for diesel/electric, and 2·55 for diesel/steam traction. However, the values significant to the operator are the drawbar efficiencies. Proceeding as before:

$$P_t/P_d = 1 + W_{tot} \times r/W_{tr} \times r_t$$

Where P_t = overall efficiency = power output at wheels/heat content of fuel, P_d = mean drawbar efficiency = power output at drawbar/heat content of fuel, W_{tot} = locomotive weight, W_{tr} = train weight (less locomotive), r_t = specific tractive reistance of train (including air resistance) lb./t. r = specific tractive resistance of locomotive (excluding air resistance) lb./t. With $r/r_t = 1{\cdot}35$, $P_t/P_d = 1 + 1{\cdot}35\ W_{tot}/W_{tr}$.

As the diesel locomotive weight claims about twice the weight of an electric

output will be of the Bo-Bo type weighing 60 tons. A diesel-electric locomotive requires an installed power output of 2,850 h.p. and would weigh about 190 tons, which calls for two Bo-Bo or even Co-Co units. The performance characteristics of both locomotives pulling trains of 35 t. bogie carriages are plotted in Fig. 12. For the sake of completeness the performance data of a 2,000-h.p. Co-Co diesel-electric locomotive is included as well.

On the score of fuel consumption the diesel engines are not so much better than electric locomotives. For example, when pulling a 350-ton train at 70 m.p.h. on the level, the electric locomotive must develop some 900 h.p. at the wheels, compared with 1,100 h.p. required from the heavier diesel-electric locomotive, so that the ratios of efficiencies will be only 1·145 whilst parity will be attained at 70 m.p.h. with a trailing load of about 175 t. also on the level. Already on a grade of 1 in 200 the diesel-hauled 350-ton train needs 1,785 h.p. to maintain 60 m.p.h., whilst the electric locomotive must develop 1,360 h.p., *i.e.*, the efficiency ratio will be $1{\cdot}4 \times 1{,}360/1{,}780 = 1{\cdot}07$ in favour of the diesel locomotive.

Whilst maintaining a speed of 70 m.p.h. on 1 in 100 the power outputs will be 1,700 and 1,275 h.p. respectively, so that the efficiency ratio will become $1{\cdot}4 \times 1{,}275/1{,}700 = 1{\cdot}05$.

Highly supercharged diesel engines capable of ensuring an efficiency of 0·45 have been developed[7] already. Further efforts should be concentrated on the design of lighter locomotives, as at present the main-line diesel locomotive is rather heavy and here a careful investigation of the possibility of reducing the weight of all structural components as well as the transmission should have good results.

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Zonal Centres on the French National Railways

Co-ordinated rail-road services in conjunction with private hauliers

LIKE other railways, the S.N.C.F. has found that frequent transhipments impede its efforts to provide speedy transit, particularly for smalls traffic. In addition, it has been most anxious to find a means of closing unremunerative branch lines without prejudicing the services offered to the public. The permission of the Minister of Public Works & Transport was obtained to experiment with the operation of zonal centres at Angers, Chalon-sur-Saône, and Angoulême. Since the middle of 1951, freight services have been suspended on certain lightly-used lines, previously closed to passenger traffic, within radii of approximately 19 miles around each of these centres, and freight traffic, both smalls and wagon-load, has been moved since then by road to and from the zonal centre.

The system operated by the S.N.C.F. is similar to that developed on British Railways for smalls traffic. The handling of freight has been concentrated at selected stations, but there are essential differences between the British and French practices in the road conveyance to and from the zonal centres.

In Great Britain complementary road vehicles are generally owned by British Railways or at least by the British Transport Commission, but local road transport undertakings, working under contract to the S.N.C.F., perform this function in France. The responsibility for the road services is entirely that of the S.N.C.F., and the appropriate railway rates are applied to the traffic; the chargeable distance is based on that previously in force from the closed local station. A small supplementary charge is made for collection from, or delivery to, a trader's premises, where this is required.

This procedure is in accordance with a section of the French Government rail-road decree of November 14, 1949, which provides that where railway freight services are withdrawn from lines with the authority of the Minister of Public Works & Transport, the S.N.C.F. shall continue, in so far as the consignor and consignee are concerned, to be legally liable for the conveyance of goods in accordance with the railway rates' scales. Traders are still permitted, if they wish, to collect traffic from, or deliver it to, the appropriate centre by their own vehicles.

Use of Trailers and Containers

In France considerable use is made of rail-road trailers, wagon-carrying trailers, and containers for conveying merchandise between the zonal centres and traders' premises. In Great Britain, the use of wagon-carrying trailers is not considered economic and the operation of rail-road trailers is not actively encouraged except for some special traffics. Some comments on these vehicles were recently included in a paper to the Metropolitan Section of the Institute of Transport by Mr. A. A. Harrison, Executive Officer (Road Transport) Railway Executive, to which we referred in our January 18 issue.

Containers, although widely used on British Railways, are normally handled at the nearest station to the trader's premises, as the zonal system in Great Britain applies only to smalls traffic, and is not invoked to facilitate the closing of sections of line. Considerable economies are claimed by the S.N.C.F. from the concentration of the handling of freight at zonal-centre stations, whilst the use of modern methods of handling is thereby encouraged; and next-morning delivery of freight throughout a wide area of France is guaranteed for traffic delivered to the S.N.C.F. by the late afternoon.

Measures have been taken to protect traders with private sidings. The S.N.C.F., as far as possible, has avoided closing lines where private siding traffic would be apreciably affected, and, in some cases, services have been maintained to and from such sidings even though the section of line has been closed for other traffic. As the experience of the S.N.C.F. with the operation of zonal centres is still somewhat limited, it is difficult at the moment to draw final conclusions.

The recent tests at Angers, Chalon-sur-Saône and Angoulême were not the first experience of the S.N.C.F. with a zonal centre. In 1947, to offset difficulties arising from engineering works on the Paris-Lyons line, the handling of traffic in consignments of less than five tons was temporarily concentrated at a number of railhead stations spaced about 62 miles apart. Road services, provided by contractors, were operated between intermediate stations and the railhead centres.

Ticketless Travel on the Central Railway, India

Types of fraud and methods of detection and prevention

By A. C. Read,
Deputy Chief Traffic Manager, Central Railway, India

THE annual loss to the Indian railways from ticketless travel has been estimated by Mr. K. Santhanam, Minister of State for Transport & Railways, at from Rs. 2 to 3 crores (about £1,500,000 to £2,250,000). Against this, he said that the total collections from ticketless travellers during 1950 were Rs. 1,86,80,845 (about £1,400,000).

These figures are probably no overestimate. On the G.I.P. Railway (the principal constituent of the newly-formed Central Railway), the amount collected by the ticket checking staff in the year 1950-51 was: from ticketless travellers, Rs.18,60,000 (about £139,500); on unbooked luggage, Rs. 5,52,000 (about £41,000). The route-mileage of the G.I.P. Railway was 3,617. Passenger miles in 1950-51 were 6,244 millions, and passenger earnings, Rs. 14,79,35,000 (about £11,100,000).

Excess fare collections however, give no real indication of the amount of ticketless travel. An increase in excess fare collections can be due to more ticketless travel, but also to more efficient ticket checking, and it is quite possible for the excess fare collections to rise in spite of less travelling without tickets. It is easy to show that the amount collected is only a fraction of the loss.

The Central Railway has two squads of specially selected inspectors. These men are used, among other purposes, for temporarily strengthening the ticket checking staff at a particular station or section to secure almost 100 per cent. efficiency. A comparison of the excess fare earnings of the special check period with the earnings of the regular staff gives an idea of the loss resulting from ticketless travel.

Some examples are given in the table below:—

Date of special check	Station	Monthly excess fare target	Average daily earnings of regular staff		One day's earnings of headquarters and regular staff		Daily loss
		Rs.	Rs.	Annas	Rs.	Annas	Rs.
6.9.51	A	400	13	2	84	8	71
8.9.51	B	1,200	25	8	104	13	79
26.9.51	C	2,000	23	8	455	0	431
5.10.51	D	4,000	73	10	704	7	631
12.10.51	E	6,000	49	0	703	3	654
19.10.51	F	not fixed	1	0	91	3	90
25.10.51	G	2,000	79	10	368	10	289
20.11.51	H	200	1	0	96	0	95
14.12.51	I	800	6	8	174	7	168
19.12.51	J	3,000	24	12	279	12	255

The figures of loss so estimated are used to justify financially the provision of extra ticket checking staff, improved fencing, and to show the regular staff the potentialities of their station. It will be observed also from the table that for most stations a monthly target for excess fare collections is fixed. This is deliberately fixed fairly low, to be within reasonable reach of the permanent staff, and stations which attain their target each month are commended in the gazette issued by the Central Railway.

The figures of daily loss shown in the last column are undoubtedly high. This is by no means entirely due to lack of efficiency of the regular staff. They are usually too few to guard all the unauthorised exits from the station—by the ends of the platforms, by alighting on the off-side, and so on. Fencing of stations is often inadequate and where it is provided, gaps appear in it with monotonous regularity. That there is much room for improvement, however, is obvious.

At the larger stations the earnings of the headquarters squads plus the regular staff are from 5 to 20 times the earnings of the station staff alone. It is not to be assumed from this that, on the railway as a whole, only from 1 in 5 to 1 in 20 of ticketless travellers are detected. Most of the excess fare earnings of the railway come from travelling inspectors, and when these men are augmented by the headquarters squads, the increase in earnings is not nearly as great. If, at all stations, the efficiency of ticket checking could be increased to the standard attained when the headquarters squads are there, the total increase in excess fare earnings would be less than 5 to 20 times, as the efficiency of ticket checking at one station reacts on the excess fare earnings at neighbouring stations.

Nevertheless, a considerable section of the community calculates that it pays to travel without a ticket and risk detection. It seems probable that the loss caused by ticketless travel on the Central Railway is at least 3 or 4 times the amount collected as excess fares, that is, about Rs. 55 lakhs to Rs. 70 lakhs a year (about £400,000 to £500,000) on the G.I.P. section of the Central Railway. This estimate excludes the mendicants, who travel in considerable numbers. They can pay no fine and imprisonment means to them luxurious living. Many of them are religious "Sadhus," whom many of the staff are afraid to oppose. Nothing can be done except turn them out of railway premises.

Mostly, passengers detected travelling without tickets pay the excess charges due without the need for prosecution. Of Rs. 18,89,000 collected in 1950-51, Rs. 18,60,000 was collected without reference to magisterial courts.

The Indian Railway Act provides two main sections for dealing with the ticketless traveller. Section 112 covers the passenger who travels without a proper ticket "with the intent to defraud," and provides for a maximum fine of Rs. 100 (about £7 10s.) plus the single fare. Section 113 provides for the ticketless traveller when there is no "intent to defraud"; the penalty is double fare, or As. 8 (about 9d.) plus single fare, which ever is greater. The railway is authorised to collect the charges due under Section 113, or remove a person from the train, without reference to the courts. Cases under Section 112, when there is intent to defraud, have always to be referred to magisterial courts. Fines realised under Section 112 go to the court, but penalties under Section 113 go to the railway.

During 1950-51 the number of cases referred to the courts and the amount realised by the railway were:—

Under Section 112 ...	15,211 ...	Rs. 5,503
,, ,, 113 ...	6,663 ...	Rs.17,606

System of Ticket Checking

The primary safeguards against ticketless travel are the ticket collectors at the entrances to and the exits from the stations. Because of unauthorised exits and entrances, they can never be fully effective, and anyhow, they have no check over passengers with third class tickets who travel in a higher class.

It is therefore necessary to check the tickets of passengers in the train, and different grades of staff are deputed for this purpose. Certain stations, usually from 50 to 100 miles or so apart, where trains halt long enough, are nominated as "checking stations." At these the station ticket inspectors check the tickets from end to end of a train, or as much of it as is possible during the time of halt. Upper class coaches are not checked at night.

Besides these "stationary" inspectors, there are travelling ticket inspectors. On most sections they work to an irregular programme, travelling a distance on one train and then transferring to another. As few Indian trains have corridors, these men, having entered one compartment as a train

leaves a station, have to remain there until the next stop. The absence of corridors makes ticket checking much more difficult, but for the sake of the security of passengers, specially at night, they cannot be widely adopted.

On some sections, what is known as the crew system is adopted. Under this system, instead of a spot check, every train is manned for a considerable distance by a crew of up to four men. This is adopted, for example, on part of the Bhusawal Division of the Central Railway. As all the principal trains in and out of Bombay, except those in the direction of Madras, have to pass over this section, it is geographically well situated for the intensive check.

In some States, the magisterial system is adopted. This consists of parties, each with a magistrate, about three ticket inspectors and a posse of railway police, who travel together. Ticketless travellers are prosecuted and dealt with on the spot by the magistrate. This system has been found extremely successful in Uttar Pradesh (formerly United Provinces). Where this system is not adopted, railway staff dealing with a ticketless passenger who refuses to pay face a difficult problem. They have to guard him, feed him, and escort him to a magistrate's court, perhaps many miles away from the railway. Naturally it is easier for them to close their eyes.

With a railway magistrate on the spot, summary justice is executed without delay. The psychological effect on the potential ticketless traveller is considerable, and it has much reduced ticketless travel. Part of the cost of the magistrates is borne by the railway, and the scheme has proved financially fully justified.

The number of ticket checking staff on the G.I.P. Railway on March 31, 1951, was: ticket inspectors, 161; crew staff, 159; ticket collectors, 976.

The total cost for the year was Rs. 22,26,00 (about £167,000). This cost is just covered by their collections in excess fare and unbooked luggage referred to above. The main justification for their existence is, however, their deterrent effect on the ticketless traveller, rather than the amount of money which they bring in.

Increased Booking Facilities

The efforts to control ticketless travel are not all directed at catching and punishing the offender. It is well realised that it must be made easy to buy a ticket. As part of an extensive passenger amenity programme, extra booking windows have been opened, the hours of opening have been extended, and at busy stations situated in the Bombay suburban area, electric ticket-issuing machines have been installed.

Apart from the ticketless traveller, the railway has to cope with different types of fraud, some very ingenious. The most serious is the sale a second time of used card tickets. Tickets are supposed to be nipped as the passenger passes the gate, but specially in the Bombay suburban area, where the rush is great, nipping of all tickets is not possible. Sometimes un-nipped tickets collected at destination have been sent back to the station of origin by dishonest railway staff and sold from the booking office a second time, the money being shared by staff in collusion. In other cases passengers have evaded having their tickets collected, and the tickets have been sent back and sold by non-railway men near the booking office.

These frauds were practised on a wide scale in the suburban area, and although many defrauders were caught and severe action was taken, it continued unabated. It has recently been decided to imprint the time of issue as well as the date of issue on each ticket, and this appears to have had a good effect.

Forged Season Tickets

Another fraud was with season tickets. It was accidentally discovered that two season tickets presented for renewal were identical, with the same running number, the same name of owner, the same dates of issue and expiry, and available between the same points. Inquiries showed that one season ticket was genuine and one had been forged in a private printing press. Further investigations showed that both genuine and forged tickets were being hired out to other persons. Some enterprising persons were buying a number of season tickets in fictitious names, both male and female, and having a number of copies forged locally. Then both genuine and forged tickets were being hired out to the public for the day at rates much below the return fare.

There were therefore two problems, the prevention of forgery, and the prevention of hiring out season tickets. The forging of season tickets was made more difficult by printing a background hatching, like that on a cheque, on every season ticket. Such a background can be produced only in a well-equipped press, which was not at the disposal of the forgers.

To combat the hiring out of season tickets, spaces were introduced on the ticket for the age and signature of the holder, and the tickets were made invalid unless the spaces were filled in. If the apparent age of the person using the season ticket differed markedly from that shown on it, he was asked to sign his name on a piece of paper and this was compared with that on the ticket. For illiterates, the thumb impression was used. In this way, many cases of lending or hiring of season tickets were detected, and misuse was checked.

The railway had also to contend with bogus ticket inspectors, who posed as railway servants and collected money from unsuspecting passengers. Usually their activities were short-lived.

Other frauds were perpetuated with an excess fare ticket book which had been lost and had fallen into wrong hands. Excess fare tickets were issued from it to cover long journeys all over the country. Several cases were detected because of errors in the way the tickets were written out, and once the scheme was known, all were warned to look out for tickets of that serial number.

Ticket Exchange Fraud

The meanest fraud is the ticket exchange, and here it is not the railway which loses, but the fellow passenger. The swindler gets into conversation with an illiterate passenger, from whose luggage, and so on, he suspects to be going on a long journey. Usually women are the victims. The method is on the following lines. He pretends to help her and makes an excuse to see her ticket. Having got her long-distance ticket in his hand, he says that something is wrong with it and he will call a railway official. Then he pockets the long-distance ticket and gives the woman back a short-distance ticket which he has bought, and goes off " to call someone." He does not reappear, and not until her ticket is checked later on the journey does the victim realise she has been cheated. After the train has left the swindler takes the long-distance ticket back to the booking office with a story of having missed the train, and claims a refund on it.

Several of these swindlers have been caught and have received long sentences, and much publicity has been done to warn passengers. Arrangements have been made for tickets of below 50 miles to be different in appearance from those over 50 miles, so that the illiterate passenger can easily see the difference.

WITHDRAWAL OF LAST LONDON TRAM SERVICES.—The remaining tramway routes in South East London (40, 44, 46, 72, 36/38) will cease running on the night of July 5-6 and will be replaced by bus services. The final conversion was originally not intended to take place until October.

BRITISH STANDARD FOR FILLER ALLOYS FOR BRAZING.—A new British Standard (B.S. 1845:1952) supersedes the two previous standards dealing with filler alloys, namely, B.S. 206:1941, Silver Solder (grades A, B and C); and B.S. 263:1931, Brazing Solder. Copies of the new standard may be obtained from the British Standards Institution, Sales Branch, 24, Victoria Street, London, S.W.1, price 2s., post free.

RADIO EQUIPMENT FOR B.R. CROSS-CHANNEL SHIP.—Marconi Marine radio communication equipment and navigational aids are being fitted on board the new twin-screw passenger and car-carrying vessel *Lord Warden*, which, on completion, will be delivered to British Railways for use on the cross-Channel service between Dover and Boulogne. A Marconi Marine Reliance transmitter, a Transarctic transmitter-receiver, and a Mercury receiver are being installed. The Transarctic provides facilities for telephony and telegraphy working, is battery-operated, and provides a link with the shore telephone services. The Reliance transmitter operates in the medium waveband, while the Mercury covers medium and long wave reception. A Lodestone direction-finder and a Radiolocator radar installation will assist in the navigation of the *Lord Warden* in all conditions of visibility.

Train Describers for Liverpool Street-Shenfield Electrification

Automatic apparatus operating on a coded impulse system using standard telephone type equipment

Display panels and set-up unit mounted above the lever frame in Hackney Wick signalbox

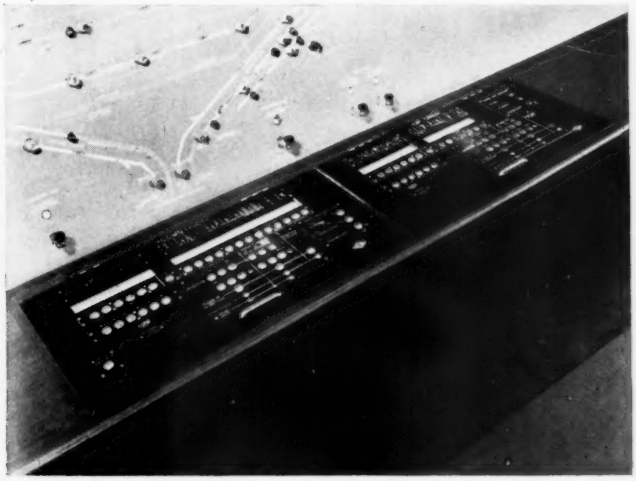
A NEW train describer system associated with the resignalling in connection with the Liverpool Street-Shenfield electrification, Eastern Region, has now been completed and brought into service. The system is the largest of its kind to be installed, and operates over a four-track continuously track-circuited section of line between Liverpool Street and Romford, with a four-track branch from Bethnal Green to Hackney Downs, a double-track branch from Bow Junction to Gas Factory Junction, and two additional tracks from Liverpool Street to Bethnal Green. Reference to the forthcoming installation of these train describers was made in the article describing the resignalling in our December 15, 1950, issue.

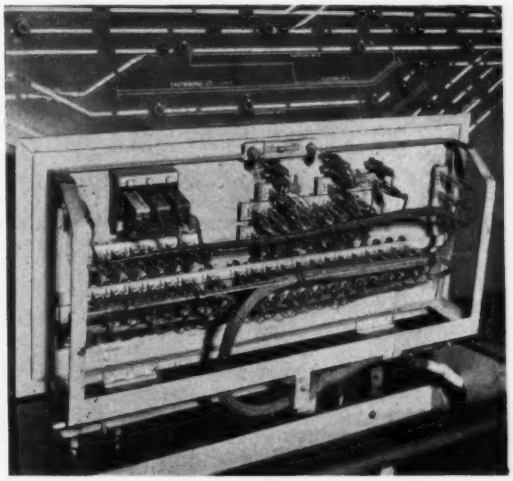
The main-line signalboxes concerned are: Liverpool Street, Bethnal Green, Mile End, Bow Junction, Stratford, Forest Gate Junction, Ilford, Ilford Carriage Sidings, Goodmayes, Chadwell Heath, and Romford.

The system is fully automatic in that a description initiated at Liverpool Street or Romford is automatically transferred from signalbox to signalbox in step with the progress of the train concerned.

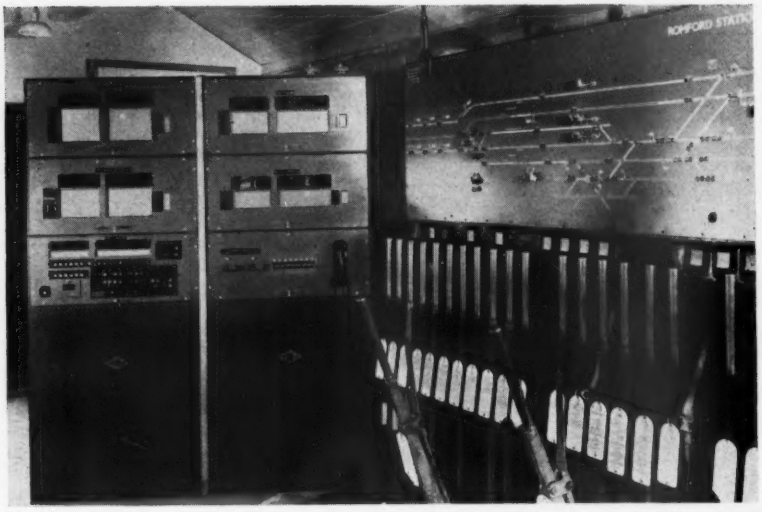
Each signalbox is provided with a transmitter and a "Last Sent" indicator for each track leading away from the box, and with a receiver indicator for each track approaching the box. The receivers consist in general of a number of indicating lamps (varying from 11 to 29) arranged in a horizontal row. These lamps are repeated in as many horizontal rows as may be necessary. The bottom row is labelled "Third in Section," and the rows above —in ascending order—"Second in Section," "First in Section," "At Signal 'X'," "At Signal 'Y'," "At Signal 'Z'," and "Last Sent." It will be seen, therefore, that each vertical row of lamps represents a train, which appears as third, second or first in section (depending on how many trains are between the signalbox in question and the box in rear) and then appears successively as being at each of the various signals controlled by the signalman until it finally reaches the position of "Last Sent," which indicates that it has passed into the section ahead.

The vertical rows of lamps are divided into two groups, the left-hand group consisting of seven vertical columns headed with the letters *S, E, P, G, C, L,* and *M*. Illumination of one, two or three of these lamps indicates the class of train. The right-hand group of indications denotes the destination of the train, thus a full description of a train is given by the illumination of one or more of the seven lamps, plus a destination lamp; for example, *SEP-SO* indicates a special express passenger train for Southend. The illuminated description of the train





Left: Arrangement of set-up units in desk in front of the relay interlocking panel at Stratford; and (right) a unit raised from the desk top for inspection



Display and set-up panels in cabinet type pedestal instruments at Romford signalbox, one of the terminal points of the automatic system

moves upwards as the train passes from signal to signal.

The set-up units consist of panels equipped with push-keys for setting up the required train description and destination. Twelve description keys are fitted in each signalbox, but the number of keys for destination varies according to the locations. "Interpose" and "Clear" keys are also provided for introducing or clearing descriptions at certain selected signals. Co-operative cancelling keys are fitted so that the last train transmitted to the box ahead may be cancelled.

In the event of failure of any part of the signalling equipment which may be used for controlling the working of the train describer, the signalman can operate an emergency switch (one per line) which cuts off the controlling features and, in effect, converts the apparatus to a manually operated system. When working under these conditions, train descriptions are transmitted from signalbox to signalbox by interposing directly into the "Last Sent" register, which after accepting the description, transmits it at once to the box ahead. The description in the "Last Sent" register flashes until a check has been received from the forward instrument to indicate that the description has been correctly received. When working under the emergency conditions just described, trains are cleared from the "In Section" part of the instrument by operating a key labelled "Clear 1st in Section."

In six signalboxes equipped with signalling control panels, the set-up equipment is mounted on the desk in front of the panel, but at Goodmayes it is in a cabinet forming a wing to the control panel. Where lever frames exist, the set-up equipment and the display panels are mounted in most cases in cabinets which stand so as to form wings to the lever frame, although an alternative arrangement is to mount the panels upright above the instrument shelf. The coding apparatus for operating the system is housed in metal cubicles accommodated in the signalbox relay rooms.

Operation of the System

When a train leaves Liverpool Street, Gas Factory Junction, Hackney Downs or Romford to proceed into the area covered by the system, the signalman sets up the appropriate description and interposes it into the signal position next ahead of the train. Operation of the overlap track circuit of this signal passes the description forward and from that time until the train leaves the describer area no further manual operation of the apparatus is required.

Owing to the relative shortness of the sections on this line, it was considered that if transmissions of a description to the box ahead were delayed until the train had reached the overlap circuit of the last controlled signal, the signalman ahead might not have sufficient warning of the approach of the train. To meet this possibility an "early retransmission" feature has been introduced. This facility permits forward transmission of a description when the train is passing through the intermediate signal registers, provided that all signals ahead of the train are in the "clear" position. In extreme cases the description is retransmitted a few seconds after it has been received from the rear signalbox.

When early retransmission has been effected, an indicating light appears alongside the description on the display panel. This "transmitted" indication then steps forward with the description, being finally extinguished when the train passes the last controlled signal and the description is transferred to the "Last Sent" register.

In the case of up line trains for Liverpool Street, the destination indication LV ceases at Bethnal Green and only the description of the train is automatically transmitted forward to Liverpool Street. When retransmission of this description begins a buzzer is sounded on the timekeeper's desk in Bethnal Green signalbox. This man's desk is provided with a special panel enabling him to set up the platform number at Liverpool Street into which the train is to be directed by the Liverpool Street signalman. These platform numbers are transmitted manually by the Bethnal Green timekeeper and appear on the destination section of the Liverpool Street display panel alongside the description already received.

If the overlap track circuit of the last controlled signal becomes occupied when there is no description in the register relevant to this signal, a ND (not described) indication is exhibited on the display panel and an alarm bell sounds continuously. Both the bell and the ND

(*Continued on page* 413)

Relay interlocking panel at Goodmayes, with display units at back and set-up unit in cabinet forming a wing at the right hand end of the desk, matching the telephone cabinet in foreground

RAILWAY NEWS SECTION

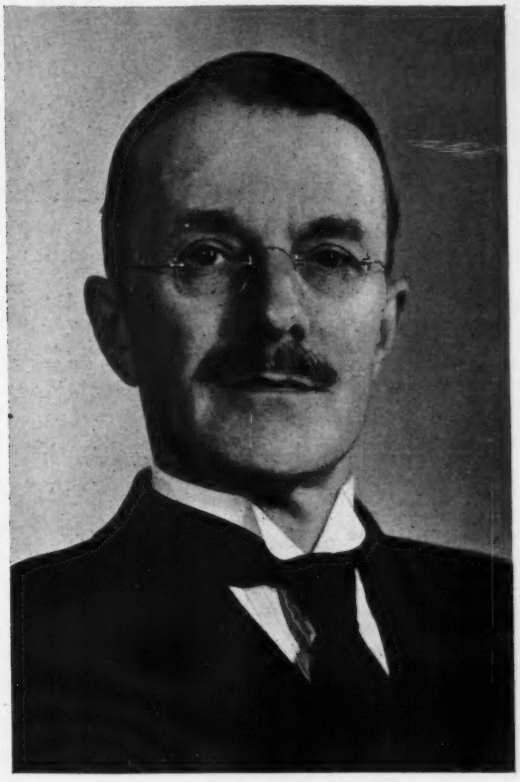
PERSONAL

Mr. W. T. P. Perkins, General Manager of the Transport & Harbours Department, British Guiana, has been appointed Chief Engineer, Nigerian Railway.

Mr. S. Williams, M.I.R.S.E., President of the Institution of Railway Signal Engineers for 1951, is Signal & Telecommunications Engineer, London Midland Region, British Railways, and joined the Signal Department of the L.N.W.R. at Crewe in 1906. During the 1914-18 war he served overseas with the Royal Artillery; he was mentioned in despatches and was demobilised with the rank of Captain in September, 1919, after which he returned to his pre-war duties at Crewe. From 1920 his services were on loan to the Ministry of Transport for the remaining period of Government control of the railways, and he then returned to the L.N.W.R. at Crewe. In 1929 Mr. Williams was appointed Signal Assistant to Divisional Signal & Telegraph Engineer, Derby, L.M.S.R., and in 1931 he became Development Assistant (Outdoor) to Signal & Telegraph Engineer at headquarters. He was made New Works Assistant at headquarters at Euston in 1937, Indoor Assistant (Signals) in 1943, and Signalling Assistant in 1944. In 1946 he was appointed Divisional Signal & Telegraph Engineer at Manchester; and he was recalled to headquarters as Acting Assistant Signal & Telegraph Engineer in February, 1948. Mr. Williams was appointed Signal & Telecommunications Engineer, London Midland Region, in July, 1948.

The North Eastern Region has announced the appointment of Mr. W. D. Havelock, District Goods Superintendent, Wolverhampton, London Midland and Western Regions, as District Commercial Superintendent, Hull, North Eastern Region.

Mr. S. Williams
President of the Institution of Railway Signal Engineers for 1951



Mr. T. S. Lascelles
President of the Institution of Railway Signal Engineers for 1952

Mr. T. C. Groves, Assistant Divisional Storekeeper, St. Rollox, Scottish Region, has been appointed Storekeeper, Cowlairs.

British Railways, Eastern Region, has announced the appointment of Mr. W. S. Torble, Assistant Works Accountant, Stratford, as Works Accountant, Stratford.

The Railway Executive announces the appointment of Mr. R. L. E. Lawrence, District Operating Superintendent, London Midland Region, as Operating Assistant, Railway Executive headquarters, London.

Mr. T. S. Lascelles, who was elected President of the Institution of Railway Signal Engineers for 1952 on April 2, is Director & General Manager, W. R. Sykes Interlocking Signal Co. Ltd., which he joined in 1909. He was engaged at first on the construction of mechanical locking frames and signal fittings, then being manufactured for the company at the works of the Low Moor Company, Bradford, and later on the installation of block, track circuits and other electrical apparatus on various railways, chiefly in the south of England, but also in Scotland and Ireland. After being in the drawing office and acting as Assistant to the late Mr. F. J. Sykes, Senior, he became Signal Engineer to the company in 1927 and in August, 1942, was appointed a Director & General Manager. He has been closely connected with the work of the Institution of Railway Signal Engineers, which he joined in 1913, and was a Member of Council from 1925 to 1935, when he succeeded the late Mr. A. B. Wallis as Honorary Treasurer. In October, 1947, he became Honorary General Secretary & Treasurer and continued in that combined office until December 31, 1949, shortly afterwards being elected a Vice-President. From 1924 to the end of the 1939-45 war he had charge of the Institution's library and was Honorary Editor of its *Journal* from 1936 to 1947. He was a Member of the Three-Position Signalling Committee appointed in 1922 and has been active in other committees dealing with the Thorrowgood Bequest and the Institution's examinations. He has always taken an especial interest in signalling practice in other countries, on which he has contributed papers to the Institution's proceedings, and has for many years maintained correspondence with signal engineers and operating officers on the Continent and elsewhere.

Mr. A. Saldanha

Appointed Deputy General Manager (Senior), Central Railway, India

Mr. D. B. Watson

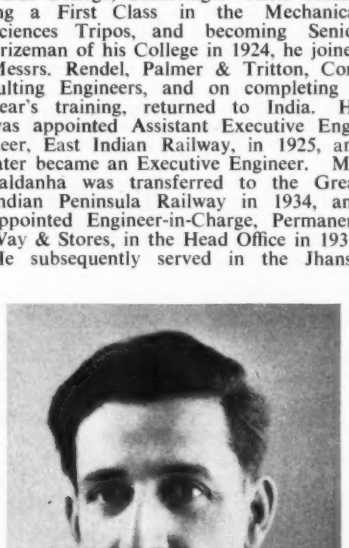
Appointed European Freight Manager Canadian Pacific Railway

Mr. J. F. T. Jensen

Appointed Departmental Manager, Tariff & Accounts, Danish State Railways

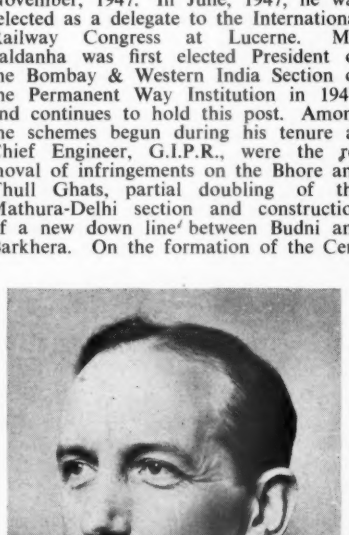
Mr. A. Saldanha, M.A. (Cantab.), M.I.E. (India), F.P.W.I., J.P., Chief Engineer, Central Railway, India, who has been appointed Deputy General Manager (Senior), was born in 1901 and educated at St. Xavier's High School, and St. Xavier's College, Bombay, and Gonville & Caius College, Cambridge. After obtaining a First Class in the Mechanical Sciences Tripos, and becoming Senior Prizeman of his College in 1924, he joined Messrs. Rendel, Palmer & Tritton, Consulting Engineers, and on completing a year's training, returned to India. He was appointed Assistant Executive Engineer, East Indian Railway, in 1925, and later became an Executive Engineer. Mr. Saldanha was transferred to the Great Indian Peninsula Railway in 1934, and appointed Engineer-in-Charge, Permanent Way & Stores, in the Head Office in 1935. He subsequently served in the Jhansi, Igatpuri, Poona, Bhusaval and Nagpur Divisions, and as Divisional Engineer, Nagpur, was responsible for construction of the Central Ordnance Depot, Pulgaon, and siting of the Military Depot at Amla. Mr. Saldanha began officiating as Deputy Chief Engineer in 1943, and was appointed Chief Engineer, G.I.P.R., in November, 1947. In June, 1947, he was selected as a delegate to the International Railway Congress at Lucerne. Mr. Saldanha was first elected President of the Bombay & Western India Section of the Permanent Way Institution in 1947, and continues to hold this post. Among the schemes begun during his tenure as Chief Engineer, G.I.P.R., were the removal of infringements on the Bhore and Thull Ghats, partial doubling of the Mathura-Delhi section and construction of a new down line between Budni and Barkhera. On the formation of the Central Railway in 1951, Mr. Saldanha became Chief Engineer.

Mr. D. B. Watson, M.C., General Agent, Liverpool, Canadian Pacific Railway, who, as recorded in our April 4 issue, has been appointed European Freight Manager, joined the Freight Department of the C.P.R. European head office in London, in December, 1913. On the outbreak of war in the following year, he joined the Middlesex Regiment and attained the rank of Major, won the Military Cross, and was twice mentioned in despatches, before reaching the age of 21. Returning to the C.P.R. in 1921, Mr. Watson rejoined the staff of the European Freight Manager and represented Canadian Pacific interests at freight shipping conferences held in this country and on the Continent. As a Regular Army reserve officer, he was called up in 1939,



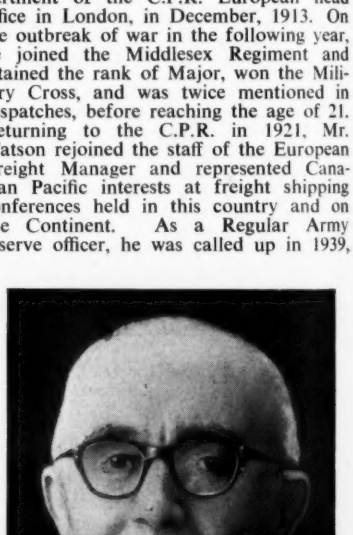
Mr. P. Protopapadakis

Appointed Development Assistant to Civil Engineer, Western Region, British Railways



Mr. Harold Ormiston

Appointed Assistant Engineer (Permanent Way), Civil Engineer's Department, North Eastern Region



Mr. Emile Lebacq

Secretary General, Ateliers de Construction de Familleureux, Belgium, who has retired

rejoined his regiment, and served with the B.E.F. He was transferred to the Royal Engineers in 1940 and the following year was given command of a battalion at the R.E. depot at Halifax, with the rank of Lt.-Colonel. In 1941 he was appointed to command the Depot Wing, R.E., at Longmoor. Mr. Watson returned to the C.P.R. in April, 1946, and held the position of Assistant General Agent, Liverpool, until his promotion as General Agent at Liverpool. He made a coast-to-coast tour of Canada a few years ago, and was cruise director aboard the liner *Empress of Scotland* during its cruise from the United Kingdom to the West Indies earlier this winter. Mr. Watson is a founder member of the Canadian Club of Liverpool and district, of which he is now Vice-President.

Mr. J. F. T. Jensen, Head of the Rates Office, Danish State Railways, who, as recorded in our April 4 issue, has been appointed Departmental Manager, Tariff & Accounts, was born in 1899. He joined the State Railways in 1918 as a traffic apprentice and became a secretary in the Staff Office in 1929. In 1936 Mr. Jensen was transferred to the Rates Office and he was appointed Head of that Office in 1943.

Mr. P. Protopapadakis, A.M.I.C.E., who, as recorded in our March 14 issue, has been appointed Development Assistant to the Civil Engineer, Western Region, was born in 1914, and educated in Athens, where he obtained first-class degrees in civil, mechanical and electrical engineering at the National University. After joining the Greek State Railways, he obtained a British Council bursary for three years. He spent the first year at University College, Southampton, the second year as a pupil under Mr. O. V. Bulleid, then Chief Mechanical Engineer, Southern Railway, and the third year as a pupil under Mr. J. C. L. Train, then Chief Engineer, Scottish Area, L.N.E.R. He entered the G.W.R. service in 1941 in the New Works Section, Chief Engineer's Department, and, after spending two years on the construction of goods loops at Aldermaston and of the doubling of the track from Weyhill to Andover Junction, was engaged on the preparation of schemes for reconstruction of several major stations. Since 1947 he has been in charge of the soil mechanics section, and has been responsible for the development of the apparatus in the laboratory, as well as for site investigations, laboratory tests and reports thereon.

Mr. Harold Ormiston, B.Sc., A.M.I.C.E., Assistant District Engineer, York, North Eastern Region, who, as recorded in our March 14 issue, has been appointed Assistant Engineer (Permanent Way), Civil Engineer's Department, was educated at Yarm Grammar School and Leeds University, and began his railway career in the District Engineer's office, Darlington, in 1933. He was transferred to York in 1934, and in 1935 commenced training as a graduate pupil under Mr. John Miller, Engineer, North Eastern Area, L.N.E.R., York. Mr. Ormiston has had experience in the Newcastle, York, and Hull districts and while at York headquarters he was concerned mostly with permanent way work, including many large remodelling and new marshalling yard schemes. He was in charge of the permanent way section during the time when designs were being evolved for switch and crossing work in 110-lb. flatbottom rail. In 1949, Mr. Ormiston was appointed Assistant District Engineer, York. He is an Associate Member of the Institution of Civil Engineers and a Fellow of the Permanent Way Institution.

Mr. Emile Lebacq, who, as recorded in our February 15 issue, has retired as Secretary General of Ateliers de Construction de Familleureux, Belgium, held his first major post in the Belgian carriage and wagon industry with Ateliers de Seneffe. He served with the S.A. Seneffe as Commercial Manager until 1919, when he resigned. In that year S.A. Familleureux was founded and together with Mr. Paul Romain, he assisted in building up in a few years one of the most up-to-date carriage and wagon works on the Continent.

Mr. W. D. Lorimer, Joint Managing Director of the North British Locomotive Co. Ltd., is attending the international economic conference in Moscow.

Mr. Kenneth Cantlie, Overseas Representative of the Locomotive Manufacturers' Association of Great Britain, is leaving this country on April 12 for a tour of Greece, Turkey, Jordan, Lebanon, Syria, and Jugoslavia. He expects to be back in this country during June.

Mr. R. T. Byford has been appointed Secretary of the Tyre Manufacturers' Conference Limited, and Secretary of the Tyre Trade Joint Committee, in succession to the late Mr. W. B. Stokes.

Mr. V. L. Ward, Stationmaster, St. Pancras, London Midland Region, has retired. He had held that post since 1947, and has been succeeded by Mr. R. Christian.

Mr. W. C. Shelton has retired from the position of Senior Sales & Technical Representative of the Hoyt Metal Co. of Great Britain Ltd. A presentation from Mr. Shelton's colleagues was made to him at a dinner given by the company recently.

Mr. F. W. Bruce has been appointed Managing Director of the Northern Aluminium Co. Ltd., London, in succession to Mr. Kenneth Hall, who has been given an appointment in the head office of the Aluminium Limited Group of Companies, Montreal.

A biography of Mr. Cyril T. Jarman, Traffic Costing Officer, British Transport Commission, London, which appeared in our April 4 issue, should have stated that Mr. Jarman was on the travelling auditor's section of the Chief Accountant's Office, L.M.S.R., Euston, before the 1939-45 war, and not before that of 1914-18.

The Minister of Transport has appointed Mr. J. E. Rigby, a nominee of the British Transport Commission, to be a member of the Transport Users' Consultative Committee for the North Western Area, in place of Mr. H. P. Aggleton, who has resigned. Mr. Rigby is District Goods Superintendent, Manchester, London Midland Region, British Railways.

Mr. Arthur E. Skan has been elected Vice-Chairman of the British Plastics Federation. He is a Director of the Ellison Group of Companies, including George Ellison Limited, Tufnol Limited, and Alfred Ellison Limited. Mr. Skan has represented Tufnol Limited on the Plastics Federation since 1934, having been a Member of the Council since 1939 and Chairman of the Laminated & Fibrous Products Group on three occasions.

Train Describers for Liverpool Street-Shenfield Electrification

(*Concluded from page* 410)

lamps are restored to normal by operating a "Bell Cut-Off" key. The signalman must then transmit the description of the train by interposing it into the "Last Sent" register.

A simple form of train describer is provided for the two carriage lines between Bow Junction and Stratford. These lines are signalled for use in both directions and each is equipped with a transmitter and receiver at both terminal signalboxes. The train description and destination are combined in one indication and the apparatus is non-automatic in operation. Twelve line wires are used between Bow Junction and Stratford for the four circuits, the codes being transmitted on the "pattern" system between these points.

Supplies and Signal Codes

All uniselectors and relays are operated from a 50 V. d.c. source. The indication lamps are lit directly from the 110 V. a.c. supply *via* 110/12 V. transformers. Standard P.O. telephone type apparatus is used throughout, the uniselectors being of the latest single coil type.

A novel feature is the employment of a "both-way" uniselector which is fitted with both forward and backward drive magnets.

The transmitted codes consist of 25 impulses, divided into two groups by a short pause. Positive impulses are used for the descriptions and negative for the destinations. The positive and negative impulses are sent alternately at the rate of 11 per second. Total time for transmission and checking back of a full description amounts to approximately 4 seconds.

One pair of line wires (40 lb. per mile A.S.P.C. cable) is provided for each section of each running line, *i.e.*, generally speaking four pairs of wires are required throughout. The codes are sent from box to box using the "constant total" impulsing system, which eliminates much of the delay experienced in older types of apparatus where elaborate "check back" circuits were employed.

The display lamps are all in duplicate, one lamp of each pair in the "description" indications being under-run. Power is supplied from 50 V. lead-acid batteries, the capacity of which varies according to the size of the installation at any particular place. Each battery is charged by a 110 V. a.c. feed from the signalling power supply system. Battery and charger connections are made with 7/·036 or 7/·044 "Ite" wire and the connection between cubicles and indicators with multi-core switchboard type cable.

The equipment was designed, manufactured and installed by the Siemens and General Electric Railway Signal Co. Ltd., to the requirements of Mr. A. Moss, Signal & Telecommunications Engineer, Eastern Region.

Ministry of Transport Accident Report

Newcastle Central, August 17, 1951,
North Eastern Region, British Railways

Lieut.-Colonel G. R. S. Wilson, Chief Inspecting Officer of Railways, inquired into the accident which occurred at about 10.36 a.m. on August 17, 1951, at Newcastle Central, when the 10.35 a.m. electric train *via* the Wallsend circular route, consisting of four motor-coach/trailer pairs, each articulated on three bogies, left No. 2 platform against the starting signal at danger and collided almost head-on with the 9.35 a.m. train of almost the same construction, Newcastle to Newcastle *via* Benton, entering No. 1 platform under clear signals. Combined speed was about 25 m.p.h. and the left-hand side of the leading coach in each train was torn away. The motorman of the incoming train and a passenger in its leading coach were killed and another passenger was fatally injured. Nineteen passengers were conveyed to hospital and eight detained; 20 others sustained minor injuries and shock. The motorman and guard of the outgoing train also were injured. Rescue work was organised promptly. The weather was fine and the rails dry.

It was estimated that with a normal start the outgoing train would have attained about 12 m.p.h. in the 36 yd. to the point of impact. Speed of incoming trains usually is about 15 m.p.h. The accompanying diagram shows the lines, signals, and so on, essential to an understanding of the case.

No. 1 signalbox is electro-pneumatic with a frame of 198 working and 62 spare levers, built in 1909. (There are some colour-light signals.) Calling-on semaphores are cleared when the running arm above is cleared, in accordance with the former N.E.R. practice. Normally by day there are four signalmen at the frame, one at the block instruments and bells, an inspector and two booking lads. All four lines to Manors are continuously track circuited. Incoming trains are signalled on the block, but outgoing ones by bell only. There is an illuminated diagram, indication locking on point levers, and normal check locking to prove that a signal arm returns correctly to danger before its lever can be restored fully normal. These locks are used also to hold the road until track circuits in advance have been occupied and cleared. No releases are provided for them and if it is desired to redirect a train after it has been stopped at a signal, the lineman has to be sent for to free the lock. The relative instruction reads:—

"When it is necessary for an electric lock to be lifted, this must only be done by the lineman on the instructions of the man in charge of the signalbox; and a suitable entry must be made in the Occurrence Book and signed by both men. If practicable, when it is necessary to alter the order of movements, a driver of a train or engine stopped at a signal which has been replaced to danger must be informed what is being done, and instructed not to move until he receives a definite verbal intimation. After a driver has been so instructed, a conflicting or alternative movement may be made. If it is not practicable to advise a driver, no conflicting or alternative movement must be made until the man in charge of the signalbox has assured himself that it is safe to do so."

Electro-pneumatic signal mechanisms have been in use for many years on British Railways and London Transport lines and have proved reliable. The circuit to a signal is broken, and the arm thus replaced to danger, by dropping a stick relay when any controlling track circuit becomes occupied; this relay is not picked up again until those circuits are clear and the lever is replaced to normal. All controlling relay contacts are between the main feed and those on the lever, and it would be impossible for the external circuit to be energised by a false feed to the internal signalbox wiring if the lever was normal.

Evidence

The signalman concerned, working at the east end of the box, had had 29 years' experience there. The incoming train was accepted at 10.35 a.m. and "entering section" was received at once; he then belled the outgoing one, as he knew it was due to start, although not yet rung out from the platform bell. He was undecided which movement to carry out first but, seeing track circuit 3 become occupied, set the route for the incoming train by reversing levers 240, 241, 242, 237, and cleared signals 247, 254, 256. He could have taken this train into the unoccupied platform 3, but felt it was wrong to disturb a scheduled working which would require a re-directing of passengers. In this he was supported by his District Operating Superintendent. The incoming train received a slight check at signal 256 and, as it was passing 254, the signalman saw the outgoing train beginning to move past 226 at danger. He put all signals to danger and blew whistle blasts from the door. He saw the collision take place. He had not pulled 226 at any time. He was sure that the platform bell did not ring, neither did the indicating shutter drop. He heard no whistle from the train. The bell circuit failed occasionally, but had been working properly that morning. He had never known signal 226 move to clear with its lever normal.

The inspector heard the signalman whistling and realised something was wrong. He saw that signals 226, 227, 229 were at danger and noticed track circuit 83 become occupied. Had the signal been put to danger by that, he would have seen the arm move. The other signalman ran to the window shouting. He had given no instruction on the order of the train movements; that was a routine matter and the signalman acted rightly. He heard no bell rung from the platform and no whistle from the outgoing train.

The guard of the incoming train saw no signal after Manors and could not recollect a check at one, but a clerk, travelling as a passenger, saw signal 247 off and remembered a check at some point after Manors.

The motorman of the outgoing train had worked almost exclusively on electric trains since 1945. He arrived off his last trip at 9.20. He said he spent some of his time in the motorman's room at the rear of the platform, leaving at about 10.30. Walking along he remarked something to the guard and noticed that the train set was not one he had worked that morning. He had to record the coach numbers afresh on his sheet, and arrived at his cab at about starting time, 10.35. Signal 226 was at danger. Still on the platform he heard the guard's starting bell, but did not see the stencil indication. He saw the guard walking away from the bell push with flag in hand. Getting in he sounded two whistle blasts and opened the brake isolating cock and dropped the left-hand window, first making sure that signal 226 was off and, unable by then to see the guard, started just after 10.35 by the station clock. Immediately after he heard whistling and shouting and thought he had struck something on the barrow crossing. He braked at once and was sure his train had stopped by the time he caught sight of the other.

Colonel Wilson could not interview the guard for over six weeks. He had had a long experience on these electric services. He came on the platform at 10.31, just before the motorman, whom he saw walking along. He denied using the starting bell; he waved his flag, after the motorman had got in, and walked forward about 1½ coach lengths to give him a better view. The motorman waved his hand in acknowledgment. Signal 226 was at danger so he sounded the bell to the box; he was sure he had not mistaken one push for the other. He got in without noticing the starting signal again. He heard no train whistle sounded.

The station foreman said he saw the guard press the bell push to the box and get in as the train was moving. He did not think he could be mistaken about which push was used, but could not be perfectly sure. He heard no whistle and did not notice signal 226.

A carriage & wagon examiner saw in front the motorman who had not reached the cab when he himself entered the second coach from the front. The guard, flag in hand, seemed to be waiting to give the signal to start. He felt no brake application.

The motorman, interviewed again, still maintained that the starting bell was sounded before he entered his cab. He did not see a flag waved. He persisted that signal 226 was cleared for him, but retracted his previous definite statement that his train had stopped before the collision. He could offer no satisfactory explanation of his arrival on the platform at the last minute after more than an hour with nothing to do.

An inspector with long experience in maintaining this installation arrived shortly after the accident. No maintenance work was being done and the casing behind the levers was securely locked. Points 241, 242 and 237 were reversed and 233 normal, making the route from the up north main, and their levers were in correspondence; signal levers 247 and 254 were against their check locks. He did not notice 256. Levers 226 and 229 were normal and the stick relay up, proving neither had been pulled. Mechanical interlocking was correct and all track circuit controls. Renewal of the installation had been retarded by the war and there had been occasional instances in the last few years where semaphores had moved wrongly to clear because of a cross feed between cables. A false clear indication of signal 84 in July, 1949, led to a minor derailment.

A scheme is under preparation for complete renewal of the signalling, and Colonel Wilson was assured that in the meantime cables were being regularly tested and renewed as necessary. A special examination of those leading to signals 226 and 229 showed them to be in perfect condition and dry. A megger test gave infinity reading. No failures of the electrically-operated air valves were known to the inspector, and

the evidence regarding the positions of levers after the accident was confirmed by the area assistant.

Chief Inspecting Officer's Conclusion

Much of the evidence was conflicting, and the statements of the motorman and guard did not inspire much confidence. The station foreman was not a good witness. The way in which the signal to start was given is not very material; the main point is the signal indication. Colonel Wilson has no hesitation in accepting the signal & telecommunications inspector's evidence on the position of the point and signal levers. There is no doubt that the signalman had set the road into No. 1 platform and at no time cleared the signal for the outgoing train. Had he done so and changed his mind he could not have put the lever back beyond the check-lock; this would have prevented him setting the conflicting incoming route, even had there been time. Signal 226 stick relay would have dropped when the outgoing train struck 83 track circuit. The signalman's statement that he saw that signal at danger is confirmed by the inspector in the box.

Reviewing all the circumstances Colonel Wilson is satisfied that no false clear indication was given and the only possible conclusion is that the motorman started against the starting signal. His own statement that he had not entered the cab when the train was due to start is confirmed by the carriage & wagon foreman. There is little doubt that he was in some confusion arising from his failure to arrive on the platform in time and was led to start on the guard's signal, however given, without satisfying himself about the fixed signal. It is unlikely that his brake application was immediate when he heard the whistling from the box; his train may have been moving at perhaps 8 to 10 m.p.h. when the collision took place. The motorman is 52, with 36 years' railway service and has a fairly good record.

The motorman of the incoming train had no opportunity to avoid the collision, nor can fault be found with the signalman's operation of the traffic. He was thoroughly alert. If the guard had looked forward at starting in accordance with Rule 148 he might have seen the signal against them and braked in time. Possibly his attention was momentarily distracted by some passengers shouting to him to let them through the barrier; and had the signal been off it would have been replaced after the train had travelled about a coach length.

At termini such as this it is seldom practicable to arrange interlocking so that collision may be prevented by the lie of the points if a signal is at passed at danger and safety of operation must depend on obedience to signals. The possible psychological effect of the guard's signal to start has not been overlooked, and it has been considered more than once whether provision should be made in the rules that the guard should satisfy himself that the fixed signal is clear before giving it. This would, however, imply some division of the driver's fundamental responsibility to observe and obey fixed signals, clearly and concisely expressed by Rule 143, in relation to the particular condition of starting from a platform, and Colonel Wilson agrees with the railway authorities that no change should be made. Discipline generally in obedience to signals is very good but it has been necessary to hold inquiries on seven occasions during the last three years into accidents caused by passenger trains starting against well displayed signals in clear weather.

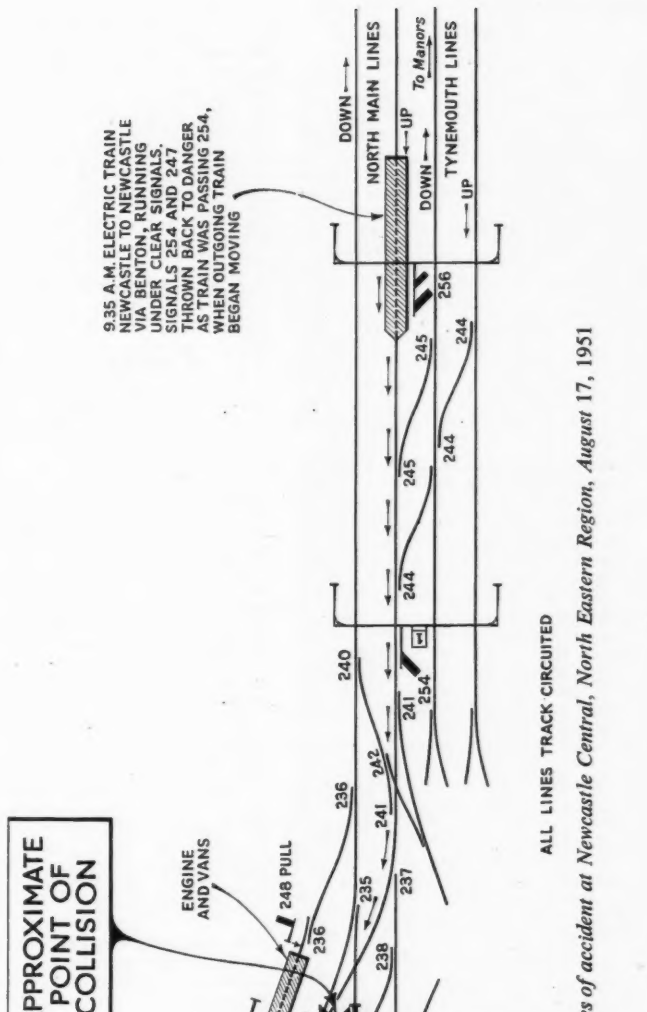


Diagram illustrating' circumstan·es of accident at Newcastle Central, North Eastern Region, August 17, 1951

Eastern Region C.R.O. at Lincoln

Mr. C. K. Bird, Chief Regional Officer, Eastern Region, met over 100 representatives of railwaymen throughout the Lincoln district at Lincoln on April 2. The headquarters of the three railway unions were represented, as were sectional councils representing railwaymen of all grades. Members from 25 local departmental committees and three workshops' committees were present, with local representatives from the smaller outstations.

Eastern and North Eastern Region officers present with Mr. Bird included:—

Messrs. C. S. McLeod, Regional Staff Officer, Eastern Region; E. W. Rostern, Operating Superintendent, Eastern & N.E. Regions; L. P. Parker, Motive Power Superintendent, Eastern Region; W. E. Blakey, Assistant Commercial Superintendent, Eastern Region; and A. K. Terris, Assistant Civil Engineer, Eastern Region.

In opening his address, Mr. Bird said the meeting was quite informal to permit a free exchange of views on the working of the Region in general and the Lincoln district in particular. Having reviewed results achieved in the Region during 1951, Mr. Bird stressed the value of all railwaymen, including management, regarding themselves as a part of a team. Only by that means could a high standard of re-results be improved upon. Referring to the Ambulance Movement, Mr. Bird expressed deep appreciation of all that railwaymen had done for it and called for all the added support possible.

There was a lively exchange of views in the discussion that followed, ranging over many aspects of railway work and employment, including punctuality, organisation, staff relations, maintenance of track, speed of freight services, turn-round of wagons and locomotive performance. Mr. Bird has now held meetings with local departmental committee and workshops' committee representatives in all districts of the Eastern Region.

English Electric Co. Ltd.

The annual general meeting of the English Electric Co. Ltd. was held in London on March 27. Sir George H. Nelson, Chairman & Managing Director of the company, presided.

The Chairman said that turnover and production had again been substantially increased during the year, and the net profit had risen by £203,984 to £1,132,550. Continued expansion had made it necessary to issue further permanent capital and the offer of 1,179,577 new ordinary shares made in December last had been a complete success. The company had also issued £3 million of 4½ per cent. debenture stock, 1972-77, and the proceeds of these two issues, amounting to over £6 million, had been employed in reduction of the company's bank overdraft.

Reviewing the company's activities in transport, the Chairman said that further orders for diesel-electric locomotives included the first main-line diesel-electric locomotive in Australia, which was now in service with the South Australian Railways. The first batch of general service diesel-electric locomotives for Tasmania was now in operation.

With regard to diesel-electric traction on British Railways, the Chairman said that a further main-line locomotive of this type had gone into service on the Southern Region and was running an average of 4,200 miles a week. This remarkable availability and freedom from trouble was due to the embodiment in the design of 40 years' experience with diesel engines, together with 70 years' experience generally of electrical equipment on railways. On the London Midland Region the two locomotives built for the former L.M.S.R., Nos. 10000 and 10001, had increased their total mileage to date to over 600,000 miles.

New suburban stock with English Electric equipment had been put in service on the Great Indian Peninsula Railway, and the first units of the new suburban electric rolling stock for the Southern Region were also running. An outstanding event of the year had been the completion of a modern gas turbine of 600,000 s.h.p. for the Admiralty, and an order for two 20-MW. gas turbines, the largest sets yet ordered in this country, was in hand.

The Napier company had obtained increasing business for its exhaust turbo-superchargers for diesel engines. The efficiency and reliability of these superchargers was contributing to an increasing extent to the successful trading results of the company.

The report and accounts were adopted, and the payment of the proposed final dividend of 10 per cent. on the ordinary stock was approved.

Cartage and Terminal Supervisors' Courses

Discussion of freight terminal problems and demonstration of palletisation equipment at Woking

The first of the five annual discussion courses for British Railways cartage and terminal supervisors referred to in our March 28 issue, each lasting a week and sponsored by a different Region, with some 24 students selected from all Regions, began on March 31; it was sponsored by the Eastern Region and held at the Staff Training College, Woking, of which Mr. E. W. A. de Kretser is Principal. The Conference Leader for all five courses is Mr. J. A. R. Horsley, Assistant District Goods Superintendent, Paddington, Western Region.

A visit to the course was paid by officers of the Railway Executive and Eastern and Southern Regions on April 2. The visitors were present at a discussion on terminal problems and their effect on station time and cost per ton. Under the chairmanship of Mr. Horsley the discussion was opened with a talk by Mr. H. Kinsey, of the Eastern Region, after which students expressed their views.

Palletisation

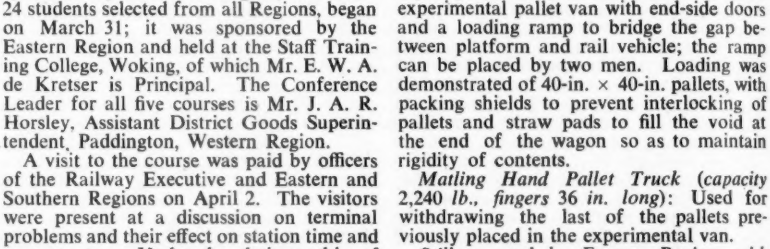
A demonstration of palletisation is a new feature of this year's courses. On April 2, visitors and students were shown palletisation and other mechanical equipment at Woking goods depot. The equipment demonstrated consisted of:—

Lansing Bagnall Power Pallet Truck (pedestrian-controlled Model No. PP36, capacity 4,500 lb.): This was used with an experimental pallet van with end-side doors and a loading ramp to bridge the gap between platform and rail vehicle; the ramp can be placed by two men. Loading was demonstrated of 40-in. × 40-in. pallets, with packing shields to prevent interlocking of pallets and straw pads to fill the void at the end of the wagon so as to maintain rigidity of contents.

Matling Hand Pallet Truck (capacity 2,240 lb., fingers 36 in. long): Used for withdrawing the last of the pallets previously placed in the experimental van.

Stillage used by Eastern Region, with bedstead sides, for domestic palletisation of sundries traffic: This pallet, 48 in. × 48 in., was moved by Lansing Bagnall power pallet truck.

Scott Electric Elevating Platform Truck (one-ton capacity): The truck was shown picking up and depositing an empty half-live stillage; the latter, loaded, was moved by the dray loader using a jacking handle to position stillage for dray loading purposes.



Positioning loaded 40-in. × 40-in. pallet in end-side door van with Matling Hand Pallet Truck over demountable ramp

B.S.A. Truck Mover (with double-flange wheels and 4½-h.p. air-cooled petrol engine).

Easy Car Pusher (manufactured by Buck & Hickman Limited): This manually operated lever was used to show its ability to replace power-operated truck mover for shorter movements.

Visitors to the course and demonstration on April 2 included:—

Railway Executive: Messrs. A. A. Harrison, Executive Officer (Road Transport); A. C. B. Pickford, Executive Officer (Terminals); and E. K. Whittingham, Assistant to Executive Officer (Terminals).

Eastern Region: Messrs. A. R. Wilson, Cartage Manager; and H. E. R. Bastin, Assistant to Commercial Superintendent (Goods Terminals).

Southern Region: Mr. W. H. Corney, Assistant Commercial Superintendent.

Cross-Channel Motorcar Conveyance Facilities

The most extensive car carrying service so far provided by the Southern Region will operate this summer on seven different routes across the Channel, accommodating about 700 cars daily. The new vessel *Lord Warden* will enter the Dover-Boulogne route on May 18. It will accommodate 120 cars and 700 passengers; by means of a turntable on board, cars will be switched round so that those first on will also be first off. A new concrete ramp at Boulogne will enable motorists to drive directly on and off the ship.

A daily service for cars between Dover and Boulogne will begin on April 20, operated by the ss. *Dinard*, until the *Lord Warden* takes over the service. From July 9 the *Dinard* will cover additional afternoon services on this route on Wednesdays, Thursdays and Fridays until September 12.

Day and night ferry services will run throughout the summer between Dover and Dunkirk. Each of the vessels has a large garage and cars can be driven on and off. Restaurant facilities are available. The *Autocarrier*, with accommodation for 26 cars, will operate daily from July 12 to September 14 between Folkestone-Calais.

From Newhaven to Dieppe a daily service will run from April 20 to October 25. This route will be operated by the motor cargo vessels, *Nantes*, *Rennes*, and *Brest*. Passengers shipping cars by these vessels travel by the ordinary passenger steamer services. Between Southampton and St. Malo a new service to be operated by the ss. *Dinard* outwards on Sundays July 6 to September 21 inclusive, returning from St. Malo on Mondays July 7 to September 22.

On Mondays, Wednesdays and Saturdays May 31 to September 29 the *Prinses Josephine Charlotte* (formerly the *Car Ferry*), which can carry 110 cars and 750 passengers, will sail between Dover and Ostend.

The Zeeland Steamship Company's passenger steamer *Mecklenburg*, with accommodation for 25 cars, will re-open the Folkestone-Flushing route on July 5 and make two sailings weekly throughout the Summer. In addition to these special car-carrying services cars will also be conveyed by the ordinary passenger services on the cross-Channel routes, including the new vessel, the ss. *Normannia*, which will operate a night service between Southampton and Le Havre three times weekly from May 19.

Parliamentary Notes

Steel Prices

Mr. G. R. Strauss (Lambeth, Vauxhall—Lab.) in the House of Commons on March 31 moved that a humble address be presented to Her Majesty praying that the Iron & Steel Prices Order, 1952, be annulled. He said that the steel industry was making enormous profits, about £75 million a year. The gap between British and foreign steel prices would be very much narrowed by the action taken by the Government. Not only the export trade would be damaged.

Effect of Increase on Railways

The railways, continued Mr. Strauss, were big consumers of steel and iron, and the increase in price meant that they would have to pay some £2-3 million a year more for the steel they bought. That would have to come, eventually, out of passenger fares and freight rates, which would have a generally inflationary effect. In view of the very heavy profits of the iron and steel industry, it would have still been possible to avoid placing such a heavy burden as was now proposed on the industries which consumed iron and steel. This would have been avoided if the major preoccupation of the Ministry of Supply at this moment were not of finding ways to hand over this publicly-owned industry to private profit interests.

Mr. Duncan Sandys (Minister of Supply), in the course of his reply to the debate, referred to the heavy increase in home costs since August, 1951, and said that rail transport costs had gone up by no less than £4½ million a year. The publicly-owned companies would be faced with the impossibility of meeting increased costs of about £70 million plus the £10 million needed to service the Iron & Steel Stock out of gross profits of £60 million. In making the increase the Government had taken into account increased costs, such as coal and transport, which had actually occurred. It had decided not to pass on the whole of the increased costs to the consumer. Increased costs in 1952 were about £75 million, but they had raised prices only enough to yield £56 million. When the Labour Minister of Supply raised prices in August last by £65 million he passed on to the consumer the whole of the increase which had occurred since he had last raised prices in February, 1951. British steel was still far cheaper than that of any other of the main steel producing countries of the world.

On a division the motion was rejected by 206 votes to 174.

Shift Workers' Fares

Captain Robert Ryder (Merton & Morden—C.) on March 31 stressed the hardship caused by withdrawal of the concession to shift workers in London, where journeys to work were longer and the cost of travel per mile much higher than in the provinces, where transport undertakings had no monopoly.

Mr. Frank Beswick (Uxbridge—Lab.) said that the Minister of Transport ought to have referred the question of shift workers' fares to the Central Transport Consultative Committee.

Mr. J. S. Maclay (Minister of Transport) said that where the Transport Tribunal had decided a matter of principle, it would be wrong for the Minister to refer that question of principle to the Tribunal.

Mr. James Callaghan (South East Cardiff—Lab.) then asked in what section of the Transport Act the B.T.C. was authorised to withdraw the concession to shift workers. Mr. Maclay replied that the whole question was put, under the Act, to the Transport Tribunal.

Questions in Parliament

Steel Allocation to B.T.C.

Mr. Austen Albu (Edmonton—Lab.) on March 31 asked the Minister of Transport what was the value of the allocation of steel so far made to the B.T.C. for each of the periods of the year.

Mr. J. S. Maclay replied that it was not the practice to disclose particular allocations. Later, he said that the Parliamentary Secretary (Mr. Gurney Braithwaite) and he had worked very hard to see that the Commission got its proper share of the allocation during the period when other priorities must have consideration.

Railway Superannuitants

Captain Robert Ryder (Merton & Morden—C.) on March 31 asked the Minister of Transport what representations he had received from railway superannuitants regarding their pensions; and if he would make a statement.

Mr. J. S. Maclay: I have received representations urging me to increase the pensions. I am giving them my most careful consideration, but am not yet in a position to make a statement.

Captain Ryder: In view of the statement made by the Chancellor of the Exchequer that consideration was being given to increasing the pensions of other Government servants, will the Minister bear in mind that this section has been very hard hit by repeated increases in the cost of living?

Mr. Maclay: I realise the great difficulties of certain railway superannuitants, and I am considering this matter as carefully as I can.

Contracts & Tenders

The order for 450 wagon underframes, which, as recorded in our September 21, 1951, issue, has been placed with the Metropolitan-Cammell Carriage & Wagon Co. Ltd., by Coras Iompair Eireann, has recently been increased to 1,000.

The English Electric Co. Ltd. has received an order from the South African Railways for 60 electric locomotives to operate on the 3,000 volts d.c. electrified lines of the Union. The order is worth approximately £2,500,000.

Each locomotive will weigh 77 tons and will have a maximum axle-load of 19.5 tons. The locomotives will be of the class "5E" double-bogie type, wheel arrangement Bo-Bo, with one-piece cast-steel bogie frames. The four traction motors will develop a total of 2,000 h.p. at the one-hour rating and the control provides for series and parallel grouping with full field and weak field running positions and regenerative braking.

A recent Reuters report from Mexico City states that the Ferrocarril de Pacifico, S.A. de C.V., Mexico (formerly Southern Pacific Railroad of Mexico), has placed orders for diesel locomotives and other rolling stock to the value of ps. 38,000,000.

The Board of Trade, Special Register Information Service, states that the Government of Pakistan, Ministry of Communications (Railway Division), has issued

a call for tenders for the following rolling stock:—

Ten metre-gauge, four-wheel open high-side wagons, " MOX " type

22 metre-gauge four-wheel goods brakevans, " MBVG " type.

The rolling stock is to be complete with body parts, underframes, vacuum-brake fittings, and drawgear, and tenders should reach the Office of the Director General, Railways, Ministry of Communications, Railway Division, Government of Pakistan, Karachi, by noon on May 21. Tenders will be opened in the Office of the Director, Mechanical Engineering & Stores, Ministry of Communications, Railway Division, Government of Pakistan, Karachi, at 11 a.m. on May 22.

A copy of the tender documents is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade, Commercial Relations & Exports Department; reference CRE/11763/52 should be quoted. Further copies of the tender documents and particular specifications can be obtained from the Office of the Director General (Railways), Railway Division, Ministry of Communications, Karachi, on payment of Rs.100 a set.

A further report from the Board of Trade, Special Register Information Service, states that the Stores Office, Thailand Railways, has issued a call for tenders (No. 95124) for a number of level-crossing barriers. The barriers are to be hand-operated and tenders should reach the Chief of Stores Office, Thailand Railways, Bangkok, before 10 a.m. on May 12.

A copy of the tender documents and drawings is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade, Commercial Relations & Exports Department; reference CRE/11549/52 should be quoted.

In a recent report the Board of Trade, Special Register Information Service, states that the Luanda Port & Railway Operating Board, Angola, has issued a call for tenders (No. 9/52) for two metre-gauge diesel-electric shunting locomotives, with a minimum haulage capacity of 500 tons on the level. Tenders should reach the Managing Engineer to the Luanda Port & Railway Operating Board, Luanda, Angola, before 10 a.m. on May 5.

Notes and News

Crown Agents for the Colonies.—The Crown Agents for the Colonies have vacancies for engineering staff in their London office. See Official Notices on page 419.

Senior Engineer (Mechanical) Required.—The Crown Agents for the Colonies have vacancy in the London office for a senior engineer (mechanical). See Official Notices on page 419.

Sales Engineer Required.—Applications are invited for the post of sales engineer, between 40 and 50 years of age, required to manage railway equipment sales company. See Official Notices on page 419.

Crown Agents for the Colonies.—The Nigerian Government Railway has vacancies for production staff for one tour of 18 to 24 months in the first instance. See Official Notices on page 419.

Vacancy for Carriage & Wagon Draughtsman.—The Cambrian Wagon Works Limited, Cardiff, has a vacancy for a carriage and wagon draughtsman. See Official Notices on page 419.

Group Engineer Required.—Applications are invited for the post of group engineer, required by the York "A" and Tadcaster Hospital Management Committee. See Official Notices on page 419.

Morganite Oil Retaining Bearings.—We referred in our February 15 issue to two publications of the Morgan Crucible Co. Ltd., one a booklet describing the firm's Reservoil bearing, designed to reduce failures and expensive lubrication; the other a catalogue tabulating dimensions of bushes. The reference numbers were incorrectly given as SO 40 and SO 41 respectively; they should be SD 40 and SD 41.

Golden Arrow Bar at Victoria.—A new Golden Arrow Bar was opened by the Hotels Executive at Victoria Station, Southern Region, on April 3. Named after the " Golden Arrow " London-Paris service, the bar is a complete departure from the old-fashioned type of station refreshment room. The décor and furnishings are modern and there is a deep carpet. Continental breakfasts, afternoon teas, and a variety of aperitifs, drinks and snacks are served, making the Golden Arrow Bar a pleasant rendezvous for travellers. This bar is the forerunner of a novel form of railway station bar which the Hotels Executive plans to introduce at other main-line stations.

Modern decoration and furnishing characterise the new Golden Arrow Bar at Victoria, forerunner of similar refreshment facilities elsewhere

British Railways Parliament Street Office Reopens.—The British Railways office at 36, Parliament Street, London, S.W.1, reopened on April 7. It had been closed since 1940. Tickets, seat reservations and information about travel on all Regions of British Railways are available.

European Steel Output.—The Economic Commission for Europe states that steel production in Europe in 1951 totalled 67,628,000 *tonnes*, an increase of 11·6 per cent. on the 1950 output. Of the important European steel producing countries only the United Kingdom showed a decrease. The estimated output of U.S.S.R., which is not included, is some 30,000,000 *tonnes*, an increase of 4,000,000 *tonnes* on the previous year.

Liverpool Overhead Traffics.—Receipts of the Liverpool Overhead Railway diminished slightly during February, with successive totals of £2,826, £2,747, £2,645 and £2,593. During each week though, traffics were above those for the equivalent period of 1951, and the largest advance was in the week ended February 3, when receipts were up by £272. The aggregate total at February 24 was better by £1,872 at £21,923.

Southern Region Easter Services.—More than 400 extra trains are being run by the Southern Region for the 275,000 passengers expected to travel this Easter to the Kent and South Coasts, and West of England resorts. A large programme of excursions has been arranged for day outings during the holiday. Cheap tickets will be issued to Chatham and Portsmouth for the Navy "At Home" days on Saturday, Sunday and Monday. Continental facilities were increased by special night services on the Newhaven—Dieppe route on April 9 and 10, and on the Dover—Ostend and Southampton—Jersey routes on April 10.

F.B.I. Overseas Scholarships Scheme in Latin-America.—The exceptional opportunities for training in Britain available for Latin-American engineering graduates will be emphasised by a British Engineering Training Mission, which, under the auspices of the Federation of British Industries, will leave for Latin-America on April 29. The mission will consist of Sir Arthur Fleming, Chairman of the F.B.I. Overseas Scholarships Committee and Director of Research & Education of Associated Electrical Industries Limited; Mr. F. R. Livock, a member of the F.B.I. Overseas Scholarships Committee and Manager of Education & Training of the General Electric Co. Ltd.; and Mr. W. V. Jenkins, who is responsible for administering the F.B.I. Overseas Scholarships Scheme. The F.B.I. has been developing scholarship projects for overseas engineering graduates over the last 20 years, and three years ago it was decided to establish an F.B.I. Overseas Scholarships Scheme, which would include graduates from developing countries, both British and foreign, throughout the world. The object of the Mission to Latin-America will be to make more widely known the training facilities available; to discuss on the spot how the F.B.I. Scholarships scheme

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

CROWN AGENTS FOR THE COLONIES

ENGINEERING STAFF REQUIRED FOR THE LONDON OFFICE. Pay addition to basic salaries shown below payable as follows:— 10 per cent. on first 500, 5 per cent. on second £500, 2½ per cent. on salary over £1,000. Extra Duty Allowance of 8 per cent. on basic annual salaries plus Pay Addition also payable at present. Engagements will be on unestablished terms, with a prospect, after satisfactory service of appointment to the established and pensionable staff in due course vacancies permitting. (*a*) ENGINEER (MECHANICAL) (M.29208.B). Salary scale £900 × £30—£960 × 40—£1,200 a year. QUALIFICATIONS: Candidates, preferably between 35, and 45 years of age, must be corporate members of the Institution of Mechanical Engineers or hold an equivalent qualification. They should have served an apprenticeship or pupilage in the Rolling Stock Department of the British Railways or with a firm of rolling stock builders. Subsequent drawing office experience in the design of steel carriages and wagons essential and knowledge of diesel railcar design desirable. Should have held a position involving technical responsibility, and should be used to preparing technical correspondence and reports. Duties will include preparation of contract specifications, examining and approving drawings, design calculations, technical correspondence and supervisory duties. (*b*) ASSISTANT ENGINEER (MECHANICAL) (M.29209.B). (*c*) ASSISTANT ENGINEER (MARINE) (M.29210.B). Salary scale £575 × £25—£750 × £30—£900 a year. The £575 minimum is linked to entry at age 25 and is subject to increase at the rate of one increment for each year above that age up to but not exceeding age 34. Fully qualified officers of at least 27 years of age who have completed at least 2 years' satisfactory service are eligible, under certain conditions, for a special increase in salary of £75. (*b*) QUALIFICATIONS: Candidates between 25 and 35 years of age should have passed the qualifying examination for Associate Membership of the Institution of Mechanical Engineers, or equivalent examination. They should have served an apprenticeship or pupilage in the Locomotive or Rolling Stock Departments of the British Railways, or with a firm of locomotive or rolling stock builders. Subsequent drawing office experience in the design of steel carriages and wagons and diesel railcars desirable, together with a sound knowledge of modern workshop practice. Duties include preparation of contract specifications, examining and approving drawings design calculations, and technical correspondence. (*c*) QUALIFICATIONS: Candidates between 30 and 40 years of age, should hold an extra Chief Engineer's Board of Trade Certificate (Steam and Motor) and be corporate members of the Institution of Mechanical Engineers. Subsequent experience in a responsible capacity involving technical correspondence and contract work is desirable. Duties will include preparation of contract specifications, examining and approving drawings, technical correspondence and general contract work. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting on letter the reference number against the appointment for which application is made. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

RATE FIXER required by old established Midland firm. Applicants must be experienced in medium heavy engineering. Preference will be given to men possessing knowledge of locomotive work. Send details of previous employment and salary required to—W. G. BAGNALL LIMITED, Castle Engine Works, Stafford.

CROWN AGENTS FOR THE COLONIES

SENIOR ENGINEER (MECHANICAL) required for the London Office. Salary Scale £1,250 × £50—£1,450 a year. Pay addition to basic salary payable as follows:—10 per cent. on first £500, 5 per cent. on second £500, 2½ per cent. on salary over £1,000. Extra Duty Allowance of 8 per cent. on basic annual salary plus Pay addition also payable at present. Candidates must be corporate members of the Institution of Mechanical Engineers, or hold an equivalent qualification. They should have served an apprenticeship or pupilage in the Locomotive Department of the British Railways, or with a firm of locomotive builders. Experience should include some years in a locomotive drawing office, and subsequent employment in a senior capacity involving technical responsibility for the design and manufacture of locomotives, steam and diesel. Organising and administrative qualities essential. Duties will include control of staff of engineers, technical responsibility for preparation of contract specifications, approval of drawings, preparation of technical reports and correspondence, and general contract matters. Apply at once by letter, stating age, full names in block letters and full particulars of qualifications and experience, and mentioning this paper to—the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting on letter M.29207.B. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

SALES ENGINEER required to manage railway equipment Sales Company; first-class Executive with experience of overseas travel and negotiations at high level. Age forty to fifty. Locomotive design experience and/or overseas locomotive running experience a desirable qualification. Remuneration plus expenses plus share of profits and pension rights all on a scale in accordance with experience and qualifications. This vacancy is one which could be attractive to individuals who have attained positions of authority and high remuneration. Replies will be treated in strictest confidence. —BOX 461 *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

CIVIL ENGINEERS, preferably with Railway Experience. Reply: Stating qualifications and salary required to—EAGRE CONSTRUCTION CO., LTD., East Common Lane, Scunthorpe.

DRAUGHTSMEN required with experience of steam or electric traction for work on mechanical design of diesel-electric locomotives. Apply to BOX 452, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

RUNNING Superintendent for the Southern Railway of Peru, must have served apprenticeship railway workshop and ten years' experience as an administrative and technical officer. Knowledge of Spanish desirable. Must be under 50 years of age. Apply Secretary, THE PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

ASSISTANT Chief-Draughtsman required by Permanent Way Manufacturers in the East Midlands. Must be experienced in British Standard and Private Sidings practice and able to take site surveys etc. Only those with P.W. experience need apply. Superannuation scheme, 5 day week, canteen, etc. Write stating age, experience, salary required to—BOX 443, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LOCOMOTIVE, CARRIAGE and WAGON SENIOR DRAUGHTSMAN 30/35 years of age. Qualifications: Must have served a full general apprenticeship in an Engineering workshop (preferably Railway) and have had at least five years' drawing office experience with some time in an executive capacity. A knowledge of Spanish an advantage. Future prospects. Apply to the Secretary, PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

CROWN AGENTS FOR THE COLONIES

PRODUCTION STAFF required by the Nigerian Government Railway for one tour of 18 to 24 months in the first instance. Commencing salaries according to age and war service in the salary scales shown which include Expatriation pay and temporary increase either (*a*) on temporary terms in scale £1,058 rising to £1,124 a year or (*b*) with prospect of pensionable employment in scale £926 rising to £1,042 a year. Outfit allowance up to £60. Gratuity up to £150 a year payable to temporary officers under (*a*) only on satisfactory completion of final service. Free passages for the officer and his wife and assistance towards the cost of children's passages or maintenance in this country. Liberal leave on full salary. They must be qualified for one of the following posts: Railway workshop experience is desirable though not essential. PRODUCTION ASSISTANT (JIG AND TOOL DRAUGHTSMAN) M.28050.A. Candidates must be capable of designing Jigs, Tools, Gauges and Fixtures for use in Railway Repair Workshops, have had at least 10 years experience of this work in medium type Engineering. PRODUCTION ASSISTANT (PLANNING AND ESTIMATING ENGINEER) M.28051.A. Candidates must have had at least 5 years experience in a Production Office as a Planning and Estimating Engineer, and be capable of taking responsibility (1) for the laying out of manufacturing operations on Master Instruction Cards giving the correct sequence of operations specifying the machines to be used and the tools, jigs and gauges required for each operation (2) for estimating the setting and operating times required and co-operating with the Speed and Feed Demonstrator in the training of workmen to carry out and work to the times laid down. (3) for specifying the type, size and quality of material to be used in the manufacture of the various fittings. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience and mentioning this paper to—the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting on both letter and envelope the reference number shown against the post for which application is made. Applicants now serving with British Railways would be eligible for secondment and should apply through their local officers. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

AN experienced Carriage & Wagon Draughtsman required by Cambrian Wagon Works Limited, Cardiff. Housing accommodation available.

WE BUY used or unservicable Steel Piles at good prices in lots of 2 cwt. or more.—THOS. W. WARD LTD., Reusable Steel Dept., Albion Works, Sheffield.

DRAUGHTSMAN required by Gloucester Railway Carriage & Wagon Company, Gloucester, preferably with Steel Car or Diesel Car experience. 5-day week. Pension Scheme in operation. Apply LOCAL MINISTRY OF LABOUR AND NATIONAL SERVICE.

JUNIOR TRAFFIC OFFICIAL with Railway Traffic apprenticeship experience required for the Southern Railway of Peru, age 20/25 years, single, knowledge of Spanish would be an advantage. Apply to the SECRETARY OF THE PERUVIAN CORPORATION LIMITED, 144, Leadenhall Street, London, E.C.3.

YORK "A" and Tadcaster Hospital Management Committee Group Engineer. Directly responsible for engineering services Bootham Park Hospital and supervision and control of all engineering plant and services in group of 15 hospitals. Ability to supervise minor building maintenance an advantage. Total staff 48. One of following certificates essential: H.N. Cert. or Dip. Mechanical Engineering; first class cert. Marine Engineering or Naval equivalent. Salary £810 × £25—£910 per annum. Whitley Council conditions. Apply with names of two referees to—SECRETARY, Bootham Park, York.

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can best be adapted to the needs of Latin-American engineering graduates; and to make preliminary arrangements for the selection of candidates. The scholarships cover all branches of electrical, mechanical and civil engineering, as well as metallurgy.

Steamer Reservation Tickets on Stranraer-Larne Route.—The number of passengers travelling to Ireland *via* Stranraer and Larne will be regulated by the issue of steamer reservation tickets, formerly known as sailing tickets, on two occasions only during the summer season. They will be required for the sailings from Stranraer on July 18 and 19, and from Larne on August 1 and 2. For sailings from Stranraer, application for the tickets should be made to the booking office, Glasgow St. Enoch, or to the District Marine Manager's Office, Stranraer Harbour.

Improvements at L.M.R. Dublin Office.—British Railways (London Midland Region) have placed an order for a complete new shop front of modern design for the city booking and inquiry office at 15, Westmoreland Street, Dublin. Work is now in progress. The interior of the office also will be reconstructed to provide more counter space and seating for visitors. An acoustic ceiling will be embodied, and the heating, ventilation and lighting system will be brought up to modern standards. In April, 1951, the Western Region office at 11, Nassau Street, was closed, and it is hoped that the alterations to the London Midland office will be completed before the summer rush begins, so that ticket sales and inquiries for both regions may be dealt with more efficiently.

Closing of North Eastern Region Stations. On April 7 passenger train services will be withdrawn from Plawsworth Station, between Newcastle and Durham; and from Staincliffe & Batley Carr Station, between Dewsbury and Batley on the Manchester Exchange to Leeds City main line. Alternative bus services are available from a stop near Plawsworth Station to Newcastle and Durham. Parcels traffic for Plawsworth is dealt with by vehicles from Chester-le-Street, and this arrangement will continue. From Staincliffe & Batley Carr

Station bus services run to Dewsbury and Batley, where rail services are available. Parcels will be dealt with at Dewsbury.

C.P.R. Earnings in February.—Net earnings of the Canadian Pacific Railway rose to $1,374,274 in February. Gross earnings during the month were higher at $35,325,097, against $34,601,193 the previous month, but working expenses fell to $33,950,823 from $34,481,856 in January.

Easter Services, N.E. Region.—The North Eastern Region has catered for Easter holiday travel by providing 234 relief trains and 157 special excursions; 116 relief trains will run into the Region over the holiday period. From Leeds to Manchester and Blackpool, 27 reliefs are being run, also 13 Leeds to Morecambe, 30 from Newcastle to Kings Cross, and 43 from West Riding stations to London.

Additional Anglo-Scottish Trains at Easter.—Anglo-Scottish services are being augmented at Easter by forty additional expresses. Eleven special trains are leaving Glasgow Central for London. Liverpool, Manchester, and Birmingham, Leeds, Sheffield and the Midlands are being served by eight additional trains starting from Glasgow St. Enoch and running via Kilmarnock. From Edinburgh Waverley eighteen special trains are being run to Newcastle, York, Kings Cross, and so on. Eight of these trains are originating at Glasgow Queen Street and two from Aberdeen.

Women's Ambulance Competition in Glasgow.—Glasgow (Women's) Section "A" has won the British Railways (Scottish Region) Women's Ambulance Competition. In taking first place, the team has won the silver rose bowl presented for annual competition by women's teams in the Scottish Region for the second year in succession. The prizes were presented after the contest on March 20 by Mrs. T. F. Cameron, wife of the Chief Regional Officer, Scottish Region. The winning team will represent the Scottish Region at the British Railways Inter-Regional Competition in London on May 16 and will also form one of the side representing Scotland at the forthcoming International Competition.

Forthcoming Meetings

April 16 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, Storey's Gate, S.W.1, at 5.30 p.m. "The Fell Diesel Mechanical Locomotive," by Lt.-Colonel L. F. R. Fell.

April 16 (*Wed.*).—Permanent Way Institution, London Section, in the Clerks' Dining Club, Bishops Bridge Road, Paddington Station, W.2, at 6.30 p.m. "Rehabilitation of French National Railways," by Mr. M. Miot, French National Railways.

April 17 (*Thu.*).—Diesel Engine Users' Association Luncheon, at the Connaught Rooms, Great Queen Street, W.C.2, at 12.30 for 1 p.m. Principal guest: Vice-Admiral (E) Sir Dennis C. Maxwell, Engineer-in-Chief of the Fleet.

April 17 (*Thu.*)—Institution of Electrical Engineers, Savoy Place, W.C.2, at 5.30 p.m. "Equipment of Battery—Electric Vehicles," by Mr. W. D. Sheers; "The Economic Basis of Battery-Electric Road-Vehicle Operation and Manufacture," by Mr. H. W. Heyman.

Railway Stock Market

More hopeful views have gained ground in stock markets, where it is pointed out that, now the Budget and E.P.L. uncertainties no longer dominate sentiment, it is easier to assess the outlook. It is assumed that investment business will increase over the next three months, and that prices may show a good rally in nearly all sections, provided there is no very big rush of new issues, which would lead to selling of existing shares with a view to taking up new shares offered on attractive terms. The rally in British Funds has been slowed down to some extent by the revived talk of a possible big issue by British Electricity.

Many leading industrial companies moreover are believed to have new issue plans under consideration. Some of these may be public issues if markets improve, though the present tendency is to favour offers confined to shareholders. The general assumption is that the better trend in gold and dollar reserves will be continued over the next three months, and that a decision on a further increase in the bank rate is unlikely to arise until June.

The bank rate, it is said, would not be raised unless there were evidence that inflation was not being checked. The present indications are that inflation will be checked, which partly explains the improved tendency in the gilt-edged market.

Foreign rails have been firmer, but movements on balance were generally small. Antofagasta ordinary and preference stocks were 15 and 65½ respectively, while Leopoldina ordinary and preference were 11⅛ and 28¼.

Canadian Pacific remained active, but at $69¼ have lost part of their recent advance. The strength of "Canpacs" has been due to renewed attention drawn to the company's oil interests and to reports that Canada may decide to allow the export of natural gas to the U.S. Because of increasing income from the company's non-railway interests, the $1.50 dividend was practically covered twice last year, but it seems that the dividend cover this year will not improve and might well decline unless there is a further increase in freight rates, bearing in mind rising costs. If the application for higher rates for grain is granted, this should improve the railway earnings.

United of Havana stocks have been quiet with the 5 per cent. debentures at 17¼. Leopoldina Terminal debentures moved up to 20½ following the news that a payment amounting to £181,885, covering the first instalment under the agreement, has been received in London. Manila "A" debentures were 66 and the preference shares 7s. 3d. Nitrate Rails shares were 22s. 6d. and Taltal 17s. 3d.

San Paulo eased to 13s. 6d., and Brazil Rail gold bonds were 5¾. Mexican Central "A" bonds were 76. Chilean Northern 5 per cent. debentures have marked 35 and Guayaquil & Quito 5 per cent. bonds 35. Costa Rica 6½ per cent. first debentures were 46 with the second debentures 24.

Among road transport shares, West Riding were 33s., Lancashire Transport 42s. 6d., and Southdown 77s. 6d. A feature was a sharp rally in B.E.T. deferred stock to £360 on estimates that the company has a favourable position in regard to E.P.L.

Engineering companies' shares have reflected the better trend in the industrial sections. Buyers have been attracted by the favourable yields and by the belief that, despite E.P.L., dividends generally are likely to be maintained. Guest Keen rallied further to 49s. 4½d., but still yield 5⅛ per cent. on the basis of the 14 per cent., dividend last year. Babcock & Wilcox at 65s. 6d. yield nearly 5½ per cent., and Clarke Chapman at 51s. 3d. nearly 5¼ per cent. In the case of John Brown at 44s. 6d. the yield is over 6¾ per cent. Cammell Laird, with the increased payment of 14 per cent. recently announced on the 5s. shares, yield over 5¾ per cent. Vickers, which have further strengthened to 46s. 6d., yield 5⅜ per cent., and the forthcoming dividend may be higher than the previous year's 12½ per cent. T. W. Ward at 69s. yield nearly 5¾ per cent., and Tube Investments at £5⅛ nearly 4⅞ per cent.

Beyer Peacock at 29s. return over 6¼ per cent., Birmingham Carriage at 32s. fully 6¼ per cent., and North British Locomotive at 16s. 4½d. nearly 6⅛ per cent. Hurst Nelson at 48s. yield over 8¼ per cent. on last year's dividend of 20 per cent. Vulcan Foundry were 22s. 3d., Gloucester Wagon 5s. shares 12s. 3d., Wagon Repairs 10s. 9d., and Charles Roberts 21s. 3d.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week: Total this year	Inc. or dec. compared with 1949/50	No. of weeks	Aggregate traffics to date: Total 1950/51	Increase or decrease
				£	£		£	£
South & Cen. America	Antofagasta ..	811	28.3.52	196,770	+ 59,320	13	1,959,250	+ 731,390
	Costa Rica ...	281	Jan., 1952	c1,495,633	+ c340,108	31	c8,756,306	+ c1,420,052
	Dorada	70	Feb., 1952	35,330	+ 3,014	9	69,700	— 4,173
	Inter. Ctl. Amer....	794	Jan., 1952	$1,315,737	+ $393	4	$1,315,737	+ $393
	Paraguay Cent. ...	274	28.12.51	G289,547	+ G102,688	26	G8,823,911	+ G3,556,978
	Peru Corp. ..	1,050	Mar., 1952	$8,659,000	+ $756,000	39	$74,638,000	+ $5,967,000
	" (Bolivian Section)	66	Mar., 1952	Bs.19,081,000	+ Bs.4,871,000	39	Bs.145,347,000	+ Bs.34,880,000
	Salvador	100	Dec., 1951	c248,000	+ c2,000	26	c883,000	+ c114,000
	Taltal	147	Feb., 1952	$2,531,000	+ $797,000	35	$17,457,000	+ $4,860,000
Canada	Canadian National†	23,473	Feb., 1952	17,346,000	+ 2,895,000	9	34,503,000	+ 4,416,000
	Canadian Pacific† ...	17,037	Feb., 1952	11,775,000	+ 1,457,000	9	23,309,000	+ 2,475,000
Various	Barsi Light* ...	167	Feb., 1952	36,960	+ 3,945	48	369,540	+ 50,557
	Gold Coast ...	536	Jan., 1952	382,363	+ 72,800	43	2,854,481	+ 279,372
	Mid. of W.Australia	277	Jan., 1952	58,380	+ 16,390	31	415,958	+ 138,744
	South Africa ...	13,398	15.3.52	1,991,877	+ 158,852	50	95,719,727	+ 9,419,382
	Victoria	4,744	Nov., 1951	2,143,056‡	—	22	—	—

* Receipts are calculated at 1s. 6d. to the rupee † Calculated at $3 to £1
‡ No comparison with November, 1950, when, due to a strike, services did not operate